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RAILWAY TERMINOLOGY.

BY LAWRENCE T. GOFF.

[Written for the AMERICAN RAILROAD JOURNAL.]

A BRIEF editorial note in the September JOURNAL explains, and I think satisfactorily, why the word "railway" is employed as a generic appellation by this publication, despite the fact that the word "railroad" is incorporated in its title. The reason adduced—that the word "railway" possesses superior adaptability—is sound, and one is naturally prompted to run over the gamut of railway terms for the purpose of instituting further comparisons as to the superiority of synonymous technical words and phrases. Railway terminology, or to use less erudite and alarming language, the science of the exact use of railway technical terms, is a branch of study sadly neglected, and as a consequence there is little uniformity in their use by the English-speaking nations. What in this country is a railroad is in Great Britain a railway; a street-railway is there called a tramway, a locomotive an engine, a locomotive engineer a driver, a fireman a stoker, a railway car a railway carriage, a railway conductor a guard, and a railway depot a station. There are a number of minor railway terms that are employed in the two countries showing equally wide differences, but those I have enumerated are the most conspicuous, and may with propriety be taken as the text of my brief discourse.

It would seem that the proper use of railway terms and, in fact, of all technical terms appertaining to any science, business or industry, should depend upon their exactness of definition and signification. A word should be obtained for everything that should mean that one thing and no other, and it is in order for us to examine the various railway terms of the two countries with a view to ascertaining which possess this desired exactness. As a minor investigation it would also be well to ascertain which have the greater adaptability, thus deciding the merits between terms in other respects equal.

Let us begin with the general terms of "railroad" and "railway." Here it will be seen that the two words possess exactness of definition and signification to an equal degree. Either word at once defines itself, and there can be no question as to their meaning no matter what the connection in which they are used. A railway is a railroad and a railroad is a railway. So far they are equally expressive, and the question between them is to be settled upon their adaptability. Making due allowance for differences of opinion I should unhesitatingly pronounce judgment in favor of railway. It is more easy of enunciation, is not open to question, as is railroad, whether it should be one or two words, or a compound or simple word, and its use is fast superseding that of the American term. In the first days of railroads in this country the word was written "rail road;" subsequently it became "rail-road," and it is but recently that the word was entirely blended into "railroad." Even now it is universal to use the expression "R. R." for the purposes of abbreviation. Railway, on the contrary, has always been railway, and its abbreviation is "Ry," which is certainly easier to express. Upon the ground of adaptability, therefore, it strikes me that railway should receive the authority of those who are aiming at a uniformity of terms. At the same time the simple word "road" is a very convenient term to apply in a general sense, and its use is not inconsistent with that of railway.

Contrasting the two terms "locomotive" and "engine," it is immediately seen that the former possesses by far the greater exactness of definition and signification. The word locomotive is strictly confined to the mechanical engine employed in railway traction, while engine means nothing beyond a motive mechanism. It may be a steam engine, or a caloric engine, an hydraulic or a pneumatic engine, a stationary engine or a traction engine, and thus *ad infinitum*, while it is at the same time frequently employed in a figurative sense. There is nothing about the word that is distinctly applicable to railways and to railways alone, while the reverse is the case with regard to locomotive. Therefore I do not think it will be questioned that by the standard of exactness the term locomotive should be given the preference over the term engine.

With some inconsistency Americans have rejected the use of the word engine and supplanted it with a superior term, while at the same time they have employed the word "engineer" in a sense in which their British brethren have never used it. Certainly on grounds of both exactness and adaptability "driver" is a better term than engineer to describe the mechanic in charge of the locomotive on the road. An engineer should be either a civil or mechanical engineer. It is, or rather should be, a strictly scientific term, and the peculiar province of engineers should not be confounded with that of the mechanic who is merely in charge of the completed mechanism. Driver is perhaps not very exact in signification, but it is so to an extent that signifies the control of motive power whether the latter be a horse or a locomotive, and unless some superior term should be introduced it should have precedence over the absurd and inappropriate term of engineer as applied to the mechanic in charge of the motive power of railway trains. For similar reasons the term "stoker" is superior to its American correlative, "fireman." A fireman generally conveys the impression of a member of a municipal fire department, and thus there is little exactness of definition, while stoker is a good old English word derived from *stoke*, a stick, signifying one who rakes or sticks a fire and thus tends it. It is employed in no other sense and is also superior to the term fireman in its adaptability.

The two terms, "car" and "carriage" next claim our attention, and I think in this comparison the Americans have the best of it. The words are from the same derivative, and in exact signification are pretty much the same thing, but car has become practically obsolete in any other connection than that of a vehicle for the transportation of railway passengers or freight, while carriage applies to all vehicles of transportation. Certainly car is a shorter and more convenient word than carriage, and thus it is superior in adaptability as well. In this connection I am reminded that the word "coach" is creeping into use on American railways as a designation of parlor, sleeping and hotel-cars, and while it is open to the same objections as carriage, it may serve a useful purpose as a class distinction among railway cars.

"Conductor" and "guard," the terms used in America and Great Britain to signify the person in charge of a railway train or car, are both open to objection on the ground of vagueness of definition, the latter term especially. It is not the duty of a railway guard to *guard* a train so much as it is to superintend it and control its movement within certain limits. Guard is a word in universal use and contains no special signification beyond that of one who exercises watchful care. Conductor is a little better, and the word more adequately expresses the appertaining duties, but that, too, is a word in general use, and is not confined to railways alone. Clearly there is room for a new word in this connection but until it is established, conductor would seem to be preferable to guard.

Of all absurd misnomers among railway terms the word "depot" stands preëminent. I believe the aspiring genius who first applied the word depot to a railway station has hidden himself from public view, and he is to be commended for his prudence, for if ever a man deserved the wrath of verbalists he is the individual. A depot is as far removed in signification from a railway station as it is from a whale. A depot is simply a magazine or storehouse, and how it ever came to be misapplied to a railway station is an impenetrable mystery. Station is the proper word, and I rejoice with the "Old Traveler" in the June JOURNAL to mark its gradual adoption in this country.

I have reserved the comparison of the terms "street-railway" and "tramway" for the last, since they are not strictly railway terms, if we confine railway to the steam-railway. Certainly from every point of view I should think tramway the better term. It is exact in definition, superior in adaptability, and open to but one construction. That street-railway is none of these can be seen from the fact that it is variously called "surface-road," "horse-road," and "street-road," none of which are necessarily correct, since a tramway need not run upon the surface of a street, nor through a street, even, and is not of necessity operated by horse-power. I am in full sympathy with the JOURNAL in its efforts to nationalize the word tramway, but I must confess I think it has undertaken a good-sized job.

To summarize, I should say that the American railway terms of locomotive, car and conductor are superior on the grounds of exact definition and signification to their British correlatives, engine, carriage, and guard, but that the British terms of railway, tramway, driver, stoker, and station are much more satisfactory from every point of view than the Americanisms of railroad, street-railway or the like, engineer, stoker, and station. In the general superiority of terms Great Britain has the advantage, and I am glad to note that this superiority is being recognized in this country by a gradual adoption of leading British railway terms. It cannot be said with equal truth that our British cousins are as readily disposed to concede our supremacy in the advantageousness of the few terms which we manifestly can claim as represented. But then we must be charitable, and remember that the idea of a change is viewed with horror by all true Britons from their birth.

Doubtless the time will come when there will be a uniformity of technical terms among all English-speaking peoples, but it will be the work of many years to bring it about. I have entered into the discussion of the subject, not with any fallacious ideas that there was any immediate hope of a symmetrical railway terminology, but simply, in as brief and unobtrusive a manner as possible, to point out the seeming defects and advantages obtaining on this side of the water. It is always interesting to enter into comparisons, when they can fairly be made, and such a case is the present.

THE INTERESTING "WEST SHORE."

BY CHARLES H. E. REDDING.

[Written for the AMERICAN RAILROAD JOURNAL.]

DURING the summer of '83, I was as curious as most travelers to try the new "West Shore" route. Accordingly I went to Albany. I returned dusty and happy. At that time I was inclined to cavil at the dust. I could not understand why some of the rock that was strewn about superfluously, was not scattered along the road-bed where it would do most good—to the passenger. Notwithstanding a few inconveniences of this nature, it was plain to be seen that the equipment was really excellent, and it was equally apparent to the feelings that solid comfort could be extracted from riding over a 42-inch steel-tired paper wheel on a heavy steel rail. In January the road was opened to Buffalo, and having allowed a sufficient time to elapse for affairs to get into smooth working grooves, I concluded I would again try it, and see the thing through, and I am free to say the trip was pleasant; very, very pleasant.

I concluded that August would be a good time to start, because, in that month, the summer tourist is abroad, and the almanac contains no giddy and contradictory reports about the weather. It is nearly certain to be continuously hot; and if a road can adapt its management to hauling large numbers of passengers who are cross and hot, in a way that cultivates the smile of confidence and comfort, it may be said to have learned the important alphabet of its business.

I knew that the West Shore had two termini in New York, but as I could not, with perfect convenience, use both at once, I compromised by dispatching my luggage over the Desbrosses street ferry, and boarded the convenient new Forty-second street tramway that lands one at the foot of West Forty-second street, facing the ferry station. It is a nice station; I liked it. I shall like it better when the Board of Health puts to a horrible death the man who empties the waste products of the near-by gas companies into the North River, thus rendering life temporarily unsupport-

able to the traveler. The boats of the company are as new, clean and comfortable as they should be, with roomy, light and airy cabins, tastefully decorated in a sober taste that pleases without wearying. At night, incandescent electric lamps supply a bountiful light.

Weehawken is not a picturesque spot, nor has it considered it at all incumbent on its stolid Dutch dignity to advance too rapidly in the wake of progress, but the railway terminus is one of the best on the Jersey side, and will be better when the passenger sheds replace the temporary expedients that the sun and rain now make merry over. When I had reached this point on my journey it was 8.20 P. M., and a section of the train composed of sleepers was in waiting. A short ride takes one through the Weehawken tunnel at the end of which the remainder of the train that took its departure from the Jersey City station is found waiting, and after a little preliminary backing and bumping, we are off at a very respectable speed in a straight line for the long tunnel that opens on the Hudson River just below Haverstraw.

A FLYING SKETCH OF THE APPROACH TO THE HAVERSTRAW TUNNEL ON THE "WEST SHORE" ROAD.

After leaving the pretty Haverstraw station it may be said that one is fairly under way, and time is had to look about and consider one's surroundings. In the present instance the surroundings were especially comfortable. Pullman Buffet Sleeping Cars are among the attractive features of the West Shore, and to make a note of the interior fittings of such a car is to catalogue the latest refinements and excellences of car-construction. One is sensible of an easy, gliding motion that has a potent effect upon the eyelids, and while you have resolved not to retire, but, on the contrary, to enjoy your cigar and the beautiful moonlit Hudson, you presently find that the porter has made your bed none too soon for your comfort. Free from draughts, and yet enjoying a perfect ventilation, you sleep the sleep of the weary, and awake refreshed, and as far as Syracuse on your journey. Meantime the Hudson River division of the road has been traversed, and those bound to Albany and further North, long ago bade you good night at Coeyman's Junction.

Stepping out on the Syracuse platform you see one of the handsomest railway stations in the State, and you also have an opportunity to consume thirty minutes in eating an excellent breakfast. As it is quite early you may prefer breakfasting later, in which case the buffet in the sleeping-car places its resources for a light meal at your disposal.

From Syracuse the journey to Buffalo is continued on a single track, through the always attractive and mildly picturesque valley of the Mohawk. At Genesee Junction, the wayfarer who prefers Rochester to Buffalo, steps into another car, and is rattled over the intervening four miles in very short order. Just outside of Buffalo the through Western passengers are shunted off upon the Suspension Bridge track, and pursue their way to Niagara Falls, there to make connections with the Grand Trunk and the West. Those who continue to Buffalo are landed very near to the Erie and Central stations, and may, without inconvenience, be transferred to the Michigan Central or Lake Shore trains. In this instance the "close connections" of the time cards, so often a hollow mockery, are a pleasant fact.

The trip seems as brief as it has been pleasant, and after fully enjoying it one begins to wonder why, and to seek for causes. To begin, the West Shore officials are polite and attentive. That is a large item in the comfort account. The passenger equipment of the road is certainly admirable. The ordinary passenger-cars have low, easy seats, large, high windows, and the artificial light is supplied by the Pintsch system, an excellent substitute for gas. The cars are hung on broad-based trucks with 42-inch paper wheels. The rail-joints alternate instead of being placed opposite each other, hence one escapes the *clickety-clack* sound and motion so disagreeably familiar, and in place of it experiences an easy, steady motion that seems more as if one was riding over an unbroken, continuous rail.

There is a seamy side however. The locomotives burn soft coal. True, other roads do likewise, but this road started out on the anthracite basis, and it is a pity it was not adhered to. Again, there seems to be a war of car-couplers. The Janey is displacing the Miller, or, perhaps it is the other way—at any rate, the transition state leads to a large amount of tinkering and delay.

But there is one feature in the Pullman car service that should decidedly be "put into circumspection and restraint." It is the porter. This voracious bird of prey is an annoyance to men, and a terror to women. In the buffet-cars there are two of the species, one of whom has half his time employed in brewing cups of tea, and making the edible sandwich, while the other half is devoted to a stealthy watch over the male chambermaid, lest he gather in more quarters than should fall to his share. Until it becomes annoying, it is amusing to observe the tactics of this precious pair, and their eager pounce upon the prey. Sometimes a victim is commanded to stand up and be dusted for the second time. If he is not too fresh and tender in the ways of the porter he will demur, and then comes an emphatic argument from one of the duo, accompanied by knowing leers, as who should say, "you may be extremely clever as a purveyor of dry goods on your native heath, but you can't get away from a Pullman porter by any such simple subterfuge as the explanation that you have already been brushed by the other Dromio." I had the satisfaction of seeing one passenger demand change for fifty cents a few minutes after he had been brushed. It was not made by the porter, because, as he averred, he had no change at the moment. Later the sufferer again made a demand on the buccaneer for his

money, but the innocent black pirate had never received any fifty cents, and turned with a truly injured expression to suggest that it must have been his Corsican brother. After considerable squabbling he disgorged. This, I suggest, is not pleasant, and is worthy the attention of the Pullmans, unless they take pride in the Dick Turpins in their service and view their antics as justifiable enterprise, enabling the company to save considerable in salaries.

The lasting impression of a trip over the New York, West Shore and Buffalo Railway, is, however, very agreeable, and it is no matter of surprise that the patronage both local and through is showing a steady, healthy growth.

THE COMFORTS OF TRAVEL.

BY ONE OF THE TRAVELING PUBLIC.

[Written for the AMERICAN RAILROAD JOURNAL.]

"CHEMIN DE FER" discourses upon the subject of Railway Art in the September JOURNAL, and so far as a poor ignorant layman can determine, he discourses very well, but I venture to assert that the vast bulk of travelers while, of course, pleased at the artistic excellence of railway stations and cars, are far more interested in the absorbing question of railway comfort. I know that is the way it strikes me, and while not aspiring to any technical railway knowledge I have traveled enough to know that comfort in travel is the chief end for which we patrons of the railways strive. We do not always get it, and a number of roads seem to regard the comfort of their passengers as a matter entirely secondary to the speed of their trains and the elegance of their appointments, but those roads among competing lines that look most carefully after the comfort of their passengers are, in the end, the roads that win the good-will of the traveling public.

It is not alone bodily comfort that we travelers seek, but mental comfort as well. We do not wish to be harrassed with fears of detention; with uncertainty regarding connections; to be pestered by officious railway hands nor rebuffed by discourteous officials. We do not wish to be worried with regard to our tickets, nor to feel that they must be used within a certain date or become void. In fact there are a score of ways that our lives may be rendered either miserable or blissful while on the rail, depending upon the mental comfort that we obtain.

As far as bodily comfort is concerned there is of course even more to be said. Nothing so upsets a man—or a woman either for that matter—as a railway journey passed amid uncomfortable surroundings. A stiff-backed seat, too large for one person and too small for two, is a great agent to render our hours of travel miserable, and I know to my cost that there are many apparently luxurious seats in palatial railway cars that are delusive in their appearance. It strikes me that the system employed by many, and in fact, by nearly all roads, of placing seats in cars, is open to objection. This system begins by adjusting the seats to the contour of the passenger's back, and that is all right as far as it goes; but at the end of the route the backs are turned over and they are expected to conform as well to the human frame in the new position as in the old. Upon the same principle a tailor might as well make a pair of trousers that could be worn with equal comfort hind-side forward.

Another so-called convenience of railway cars—inconvenience more nearly approaches the truth—are the car-windows and sashes. They are ordinarily contrived with such diabolical ingenuity that when once raised they cannot be lowered, and when lowered they resist all muscular attempts to raise them. Furthermore they are contrived to "go the whole hog" so to speak, and the passenger must either have them opened all the way or leave them hermetically closed. Recently while traveling over the Philadelphia and Reading road I observed a commendable improvement in the matter of regulating the amount of light admitted through the car-windows. The cumbrous sashes were dispensed with and in their place were tasteful window-curtains that could be raised and lowered to suit the exigencies of the case. These curtains, I should surmise, cost less than the sashes and are certainly far more convenient.

Maybe there have been railway cars that have been properly heated and ventilated, but I don't remember ever having ridden in one. They are either hot and close, or cold and draughty, but possibly the travelers are themselves to blame for this state of affairs, for of the fifty-odd passengers in the ordinary passenger-car each individual has different views with regard to the proper degree of heat and air required to insure health and comfort. It strikes me as a good plan for the railway companies to instruct their conductors in the principles of hygiene, and thus, being in a great measure men of science, they can determine the precise thermal and atmospheric conditions conducive to health.

O! thou plague of the railway traveler—the railway restaurant! How many attacks of indigestion can be laid at thy door! Of all unspeakable discomforts with which the long-distance traveler is subjected, the railway restaurant stands grandly at the head. Ill-cooked food and weak tea and coffee might be put up with, but when it comes to performing the acts of mastication and deglutition appertaining to a whole meal in the space of five minutes, two of which are consumed in allowing the viands to cool, patience ceases to be a virtue. Delmonico would blush to charge the prices which prevail at the ordinary railway restaurant, but I am certain he would die rather than furnish such food. It does not strike me that it would be difficult for the railways to introduce improvements in this question of railway restauration. Surely the allowance of a few extra minutes in which to devour the meal and the exercise of a watchful care over the methods of the restaurant would be followed by wonderful results, and the poor traveler would no longer be compelled to include the cost of a physician's prescription among the items of travel.

But why go on? The number of discomforts to which the traveling public is subjected is a goodly one, but in justice I must say that the railways are doing very well in their efforts to reduce them to a minimum, and the only trouble is that they are taking too much time to accomplish this much-needed reduction. They aim more for luxury than comfort and while the former is most pleasing, the latter is, or ought to be, the chief consideration.

Under the head of mental discomforts I could say much, but I do not wish to be reckoned a grumbler, and I will confine myself to one all-important item. I will premise my remarks under this head by dividing the *genus* traveler into two species: the long-distance traveler and the short-

distance traveler. To the former the bodily discomforts which I have mentioned come with the greater force, since their evil effects are commensurate with the period of endurance; but the latter—the poor unoffending traveler who daily, and twice daily perhaps, is compelled to journey between two contiguous points—is the one who catches the mental discomforts with all their force. Chiefly does he experience it where he patronizes local trains on through routes, where local travel is entirely subordinate to through travel. If a through train is behind time all local trains must give it right of way regardless of their schedule time. The passengers upon the local trains are all, or in great part, bound upon a business errand, or performing a daily journey to and from their places of business, while the travelers upon the through train, coming from remote points have, without doubt, made full allowance in their calculations for unforeseen detentions; but this makes no difference. There is generally competition in through travel and monopoly in local travel, and therefore the railway must perforce give precedence to the former. In the absence of any definite information as to the precise relative profits between through and local travel I cannot speak as one having authority, but I will venture to assert that there is not much difference either way as a general rule, and I therefore enter a solemn and, doubtless, ineffectual protest at this unwarranted discrimination. Why should the poor local traveler, a faithful and constant patron of the road, be kept upon the anxious seat, knowing that Jones is waiting for him at his office on important business, or that Smith is to meet him in half an hour to pay a long-standing bill, while the through traveler with plenty of time upon his hands and no immediate engagement to meet is whisked by him in the most aggravating manner? Surely this is most unjust, and yet the railways are much in the position of the late-lamented Mr. Tweed, and can calmly inquire, "What are you going to do about it?" They know that we are compelled to patronize their roads and thus they smile defiance at our puny wailings.

But I have grumbled enough, and when I consider the constant improvements that are taking place in railway traveling facilities, the increase of train accommodation, and the marked beneficial changes that are being introduced in our railway methods, I am in a great measure silenced. Upon my word I am almost forced to conclude that I couldn't run things any better myself, and this is a great confession for a traveler to make. I only wish to say in conclusion that we—the traveling public—are not inappreciative of the benefits which the railways have conferred upon us, nor of their efforts for improvement in the details of traveling; but if our views are to be consulted let us have comfort above all things. Speed is a good thing in a railway train, and doubtless there is a wish on our part for more of it; handsome railway stations and æsthetic passenger-cars are pleasing to the eye and to the soul; but these are luxuries, and while we enjoy them, we yearn for a little more attention on the part of the railways to the increase of railway comfort, and the way to find out what is comfortable is to discover what is uncomfortable. These discomforts are palpable, and by their mitigation we are put in possession of the most inestimable pleasure in life, that of comfort, and I don't think there is any kind of comfort more solidly appreciated than the comfort of travel. At least not by the fraternity of travelers in whose behalf I plead.

RAILWAY DINING-CARS.

THE extent to which these cars are already in use at the West, and their gradual introduction of late upon several Eastern roads, is beginning to raise the question whether this innovation upon former usage is likely to supersede to any considerable extent the ordinary station restaurants. A good deal of argument more or less weighty has been advanced on both sides, but the preponderance one way or the other can hardly be so decided as to arrest the increasing popularity of dining-cars, or do away with the prevailing practice of eating at stations.

According to the current issue of Poor's Manual, 312,000,000 passengers were carried on the railways of this country in 1883, which was an increase of 23,000,000 over the number carried in 1882. A very large proportion of this aggregate, of course, made short trips or carried their dinners with them, but the number who did their eating at station lunch-counters and tables must have run away up into the millions, all of which indicates pretty clearly that the business of feeding railway travelers is as yet comparatively "in its infancy," as the phrase goes. These millions are made up of all sorts of people, the most of whom can discriminate between good and poor fare, and it may be assumed that the most of them are also willing to pay seventy-five cents for a square meal if it is passably good, or a little better than they are accustomed to get at home. There is also a pretty large and increasing number who are willing to pay a dollar, and even more, for a so-called first-class hotel breakfast, dinner or supper, served in a dining-car. Now, as the railway companies are the servants of the great heterogeneous public. provision must be made for feeding people, as far as possible, according to their ability to pay. To subject all indiscriminately to a fixed regulation price for a single meal, whether it be a light or a heavy one, would be unfair, and to serve "refreshments" in the cheap-restaurant, lunch-counter style, would not comport with the luxurious appointments of a dining-car as such cars are now gotten up.

It would seem that as a matter of necessity the station eating-places will have to be maintained for a good while yet, and that trains must continue to stop long enough for passengers to eat as they now do—not in a languid, leisurely way, but in a hurry. There is also an equal necessity for dining-cars. The demand for them, as indicated by the growth of passenger traffic as shown in the figures we have quoted, is constantly increasing, and they will soon become as indispensable in all through trains as smoking and baggage-cars. The running of them may not yield a satisfactory return to the companies in every case, but once introduced, they will have to be kept up or a loud clamor will be raised by the very large class of travelers who appreciate their convenience. Their popularity thus far is obviously not due altogether to the time saved in making stops. Practically, this is a trifling matter, except as it concerns fast mail and express trains, and even these trains, whether they scoop water or feed their passengers on board, to save time, must stop every few hours to try wheels and examine journals as a matter of safety.

The successful running of dining-cars will depend in future, not so much on the attractiveness of their finish and interior arrangement, costly table-ware and elaborate bills of fare, as upon the quality of the cookery. If the

standard is high at the start, it must be kept so, or their reputation will suffer. All hotel and eating-house experience attests that this is a difficult thing to do, especially when the patronage is large and continuous and there is no very serious competition. Deterioration can only be prevented by the most intelligent and watchful supervision. Care must also be taken to avoid the mistake of trying to serve up too many dishes at once. The fare should be select rather than extensive in its variety with the view of catering to everybody's tastes. This will insure better cooking and better service, and the public will very soon learn to distinguish between quality and variety by giving their preference to the former. It is easy to dilate upon the uninviting array of stale and badly cooked eatables spread out upon the average station lunch-counters, awaiting the onset of the next train-load of hungry passengers eager to make the most of the ten or twenty minutes allowed for "refreshments." To divert people from this mode of satisfying the cravings of appetite, the dining-car system must offer something better and not very much dearer in price, with facilities in the way of sitting and standing room that will give no occasion for crowding, rudeness or ill nature. If a lunch service could be provided on these cars for the convenience of such as do not wish or care to pay for a full meal, passengers could then get on the train all that they now get at the dining stations, except the relief of getting out and walking about a little after sitting a long time in crowded cars. So far as the printed bills of fare of some of the Western dining-cars may be taken as a criterion of variety, the "spread" is all that the daintiest epicure can reasonably desire, and if the good things are well served and not all cooked in one pot, these cars are in a fair way to fulfill their mission as a blessing to traveling humanity.

The new dining-cars turned out during the current year are of course a great improvement in every way upon those that were first built, and there is also a corresponding improvement in their management, which is rendering them more acceptable to the class of people for whose convenience they were originally designed. There can be no doubt that they have come to stay, as much so as did the sleeping-cars fifteen years ago.—*National Car-Builder.*

QUEER RAILWAYS.

THE average reader, who has not made railway building a special study, will perhaps be astonished to learn that there have been railroads, not only under the ground and in the air, but in the tree-tops and on the ice, while the model of even a submarine railway has been exhibited.

It appears that some time ago a locomotive on sled-runners was constructed in Scotland, and employed for drawing passengers and freight over the ice between St. Petersburg and Cronstadt. The two driving-wheels in the rear were studded with sharp spikes, whereas the front part of the engine rested on a sled which was swiveled, and turned to the right or left by wheels working in connection with an endless screw and a segment rack. From this locomotive, which is said to have run eighteen miles an hour in any direction, the transition is natural to railroads whose ties and track have been laid on the frozen surface of rivers. In 1879, when the mercury stood twenty degrees below zero, a train of the Northern Pacific Railroad passed over the Missouri river on ice three feet thick. The pressure which the ice resisted may be estimated from the fact that the track was laid on twelve-foot ties, and that the cars carried over a quantity of railroad iron as well as a number of visitors. About a year after a similar road was built across the river St. Lawrence at Hochelaga. In this instance a rough road-bed was first levelled in the ice; then crossbeams were fitted in, and on these were placed longitudinal beams which were themselves crossed by the ties that held the rails, water being then pumped over the whole structure to freeze it down.

Even more novel is the idea of grading for a railroad through a forest with a crosscut saw, and laying the ties on the stumps. This has actually been done in Sonoma County, California. Here the trees are sawed off and levelled, and the ties are fastened on the stumps, two of which are huge redwoods standing side by side, and sawed off seventy-five feet from the ground. So firm is this support that cars loaded with heavy logs can pass over with perfect security. It is not generally known that in 1839 no less than fifty-two miles of the projected road of the Ohio Railroad Company was laid on wooden piles which were from seven to twenty-eight feet long, and driven ten feet apart in four rows. No train, however, was ever run over this track. Several wooden-track railways, on the other hand, are actually operated in the United States and Canada. One of these in the province of Quebec is thirty miles long and is used in the transportation of timber. The rails are of maple, and trains are said to run over them with remarkable smoothness at the rate of twenty-five miles an hour. Another wooden-track railway more than fifteen miles long has been constructed on the gradings of the abandoned South Carolina Central Railroad in order to carry the products of turpentine distilleries to a market.

Bicycle railways, where the car-wheels run on a single rail, have been built. One called the "steam caravan" was begun in Syria, between Aleppo and Alexandretta, but apparently never finished. In the case of this experiment the rail was raised on a wall of masonry twenty-eight inches high and seventeen and one-half inches broad. On this one rail were to travel the wheels of the locomotive and the carriages attached, but it was intended to brace the engine and the last car in the train by obliquely-placed leather-covered wheels, running along the sides of the wall, which wheels were further to serve as brakes. A single rail or bicycle railroad has also been built in the United States, and was in operation at Phœnixville, Pa., in 1876. Since that date a two-wheeled locomotive was made in Gloucester, N. J., for an elevated railroad in Atlanta, Ga., but was never shipped, as the road, a portion of which was built at Angier's Springs, near Atlanta, was never completed. With these bicycle-engines may be compared the railway velocipedes, many of which are used on Southern and Western railroads. These, which have a wheel on one rail and two wheels on the other, can be propelled by the feet and hands of the rider at the rate of twenty miles an hour.

There is nothing specially new in the project of atmospheric railways, or, in other words, of propelling carriages in a large tube, by producing a vacuum in front, and applying atmospheric pressure behind. This device has not proved of much practical value, though a tubular road of this kind was for a time in actual operation at the Crystal

Palace, Sydenham. The tube in this instance was of brick, a quarter of a mile long, nine feet high, and eight feet wide, and the car within it was used only for the conveyance of passengers. The piston that propelled the car was rendered almost air-tight by means of a fringe of bristles, extending nearly to the surrounding brick-work of the tunnel and to its floor. A fan, worked by a steam engine, both exhausted and compressed the air. The motion of the car was pleasant, and the ventilation ample.

A flying locomotive was made to justify its name at the aeronautical exhibition in England in 1868. The engine weighed thirteen pounds, and was made to lift itself, with forty pounds in addition, to a height of six inches in continuous flight around the room. The contrivance of a wind-driven chariot, or car with sails, to which Milton alludes in his "Paradise Lost" as having been employed on the plains of China, has, at various times, been made use of on the level roads of Holland. Recourse was had to the same method of locomotion about 1830 on a railroad from Baltimore to Ellicott's Mills. But a much more successful sailing car was invented for the Kansas Pacific railroad, and has been used for years as a hand-car on that road. The mast is eleven feet high, and the triangular sail has two booms. On the plains a speed of forty miles an hour has been attained by this car with the wind right abeam, the sail close-hauled, and the road full of disadvantageous curves.

It will probably be news to most persons that in 1876, at Paris, one Dr. La Combe exhibited the model of a submarine railway which he proposed to lay on the bottom of the Channel between Dover and Calais. On a road-bed of concrete, three galvanized iron rails were to be placed, two for the track and one in the center. To the central rail the car was to be attached by rollers, in order to prevent it being derailed by the waves. The boat-car was to be air-tight, and driven by a propeller-screw worked by compressed air. Fresh air was to be supplied to the occupants of the car by a tube running up to the surface of the water, where it would be affixed to a buoy. Finally, a series of buoys on the surface would mark out the track of the car, which, in case of any accident, could be cut loose below, whereupon it would rise to the surface.—*Southern Industrial Record.*

A BRIEF HISTORY OF ELECTRIC AND MAGNETIC LOCOMOTION.

THE electric motor was invented over fifty years ago, and has been in extensive use ever since. The first inventor is a matter of some dispute, but the invention follows very naturally from the investigations in electro-magnetism made by Professor Henry about 1830.

Probably the first motor giving direct rotary motion was made by Sturgeon in 1832. A number of others soon followed, but the one attracting the most attention, and on which great hopes were based, was invented by Thomas Devenport, of Brandon, Vt., and was fully described in the *American Journal of Science and Arts* for April, 1837. Of his experiments it was said, "One of the machines with a motive wheel only seven inches in diameter has been attached to a turning-lathe, and moves it with astonishing strength compared with the small size of the propelling engine."

We also find the following financial appeal, which to the stock-sellers of the present day must seem an example of untutored simplicity: "For the purpose of raising funds to carry out experiments, etc., a joint-stock association has been formed in New York, of which Mr. Edwin Williams, No. 76 Cedar street, is agent. By this arrangement, the principal interests of the patent for the United States and Europe being placed in a stock of three thousand shares, the proprietors offer an opportunity to public-spirited individuals to become associated with them in the enterprise, which it is hoped for the benefit of mankind may be successful."

Another electric motor attracting wide attention about that time was invented by Prof. Charles G. Page, of Washington, D. C. An account of this motor and its application to locomotive purposes was given in a lecture delivered by the inventor in New York, and printed in the *Scientific American* of November 15, 1851. At that early date electric motors were successfully applied to locomotion, both on land and water. In April, 1837, Sturgeon announced his having succeeded in propelling a boat, and also a locomotive-carriage, by electro-magnetism (see "Sturgeon's Annals of Electricity," vol. i., page 250). In the same publication for October, 1840, are given a cut and description of the electric locomotive of Uriah Clark, of Leicester, England, which was run for two months on a circular track at the Leicester Exhibition of that year. Devenport, whose motor was mentioned above, ran a locomotive in 1842 on a railway near Glasgow. This locomotive, which is described in the lecture by Professor Page, above cited, weighed five tons, and developed one horse-power, attaining a speed of four miles an hour. In this country, about the same time, Professor Page obtained an appropriation from Congress to aid in experiments on this subject, and constructed a locomotive which traveled from Washington to Bladensburg on the Baltimore and Ohio Railroad.

In electric locomotion by water, the most successful inventor was Prof. Jacobi, who, in 1839, propelled a boat by electricity on the Neva.

The following very interesting letter from Jacobi to Faraday is found in the *Mechanics' Journal*, 1839, vol. xxxii., page 64:

"During the past autumn, and at a season already too far advanced, I made, as you perhaps have learned from the gazettes, the first experiments in navigation on the Neva, with a ten-oared shallop furnished with paddle-wheels, which were put into motion by an electro-magnetic engine. Although we journeyed during entire days, and usually with ten or twelve persons on board, I was not well satisfied with this my first trial; for there were so many faults of construction and want of insulation in machines and batteries, which could not be repaired on the spot, that I was terribly annoyed. All these repairs and important changes being accomplished, the experiments will shortly be recommenced. If Heaven preserve my health, which is a little affected by continuous labors, I hope that within a year from this time I shall have equipped an electro-magnetic vessel of from forty to fifty horse power."

In all the inventions I have described, the source of electricity was a galvanic battery carried by the locomotive itself; but others used a stationary generator, and conducted the electricity to the propelling motor by means

of conductors laid along the track or by the rails themselves. Mr. Pinkers, an Englishman, invented, in 1840, an electric railway of this description; from his stationary source of supply the current was led to his moving locomotive by two copper conductors, which were fastened to a beam of insulating material laid between the rails; two sliding blocks of copper depended from the locomotive and rested in contact with the two conductors respectively, and thence through the two blocks the current passed to the propelling motor on the train.

Mr. Pinkers' electric railway is fully described in his English patent, No. 8,644, of 1840. A railway of this kind is described in the *Mechanics' Magazine* for 1847, vol. xlvli., page 559. It was invented by Messrs. Lilly & Colton, of Pittsburg, Pa. In the description it is said: "The power is applied, not to the locomotive, but to the track, and herein consists the novelty of the invention or discovery. Two currents of electricity, positive and negative, are applied to the rails, and thence communicate with the engine. The latter is provided with two magnets, which, by a process of attraction and repulsion, drive the car over the track. Heretofore the propelling power has been used on the car itself; in this instance, however, the power is in the rails, and an engineer may remain in one town and with his battery send a locomotive and train to any distance required." Of a later date is the railway of Bellet and De Rouvre, described in an English patent of 1864, No. 2,681, in which two wires are stretched beneath the car to convey the current to the locomotive; also that of Hallez d'Arros, of Nancy, France, in 1873, in which the inventor in his patent says, after describing his locomotive: "The battery or source of electrical power may be mounted on this carriage, as above described, or it might be fixed in position and the electrical current might be transmitted by conductors laid along the rails, or by the rails themselves."

In the railway invented by Mr. W. H. Knight and myself, which has recently gone into practical operation in Cleveland, in connection with the Brush system, we make no extravagant claims to be the first persons to whom the idea of electric locomotion has come, but we do claim that we have taken up only devices which are free as air to every inventor, and by inventions of the utmost importance have rendered electric railways a practical success.—E. M. Bentley, in the *Scientific American*.

Cheap Fares.

COMMENTING upon the latest British railway returns, the New York *Journal of Commerce* remarks: "American railroad managers should take a hint from the results of the British passenger business by rail in 1883. Running first, second, and third-classes of cars to accommodate various castes and tastes, the British railroad companies find at the end of the year that the lowest grade is by far the most productive in earnings. The official statistics for 1883 show the receipts from third-class travel to have been $85,250,500, against $16,648,500 second-class and $18,350,500 first-class. The gain in third-class for the year over the returns for 1882 is about $3,500,000, and the first and second-classes exhibit a loss in the comparison. The third-class receipts are nearly three times as great as those of the other two classes together. This is an unanswerable argument in favor of cheap travel. It explains in part why the net earnings of the British railroads in 1883 amounted to 4.29 per cent. on an increased capital—a result unexpectedly good. The statistics do not give the comparative cost of running the three kinds of cars in which these passengers were carried, but there is no doubt that the figures, if obtained, would be greatly in favor of the cheapest class. The third-class cars are always crowded, the second-class are only partly full, and the first-class on the mixed trains either go empty or carry much less than their complement of passengers. The prime cost of the better classes of cars is of course much higher than the third, and the wear and tear make a larger bill of expense for refurnishing. If the prejudices of the people did not support this distinction in cars the companies would long ago have abolished the classification and adopted the American plan. The American railroad corporations have yet to learn by thorough and systematic trials to how low a point fares can be put so as to produce the largest net earnings. It is invariably the case that some of those roads which do the most liberal commuting business earn the most money from passengers. They reduce the fare in consideration of the fact that the passenger makes daily trips. But on each trip the company must make a profit, or else the more it commutes the more it would lose. Now, if it pays to take people at reduced rates between two points by the month or for the round trip, why would it not also pay to make that rate applicable to everybody, without regard to the number of trips? This experiment has never been tried except at times when the public has demanded and almost forced it from the companies, as in the case of the great Philadelphia Exposition and other national fairs. The dividends in the years when these fairs were held indicated no decline in net earnings of the companies most affected by the reduced rates, and until the contrary is proved we are entitled to suppose that the experiment was successful. But no company in the United States has ever had the courage and faith to introduce really cheap rates of fare at all times and seasons, with or without competition as an inciting cause. Rivalry may make fares to Chicago, Cincinnati or St. Louis very low for a while, but the companies soon come to an understanding and reëstablish uniform higher rates. What the people want is more reasonable rates to non-competing points, not commutation or excursion tickets, but unconditionally cheap fares. We believe there is 'money in it' to an extent of which the companies little dream."

The Security of Railway Travel.

SPEAKING of the safety of railway travel, the current number of the *Railway Register* says: "In these modern days of the newspaper and telegraph, when occurrences in all parts of the world are chronicled for the information of the people, and when crimes and accidents are described with even too great a minuteness, we often hear of railway accidents—at least it seems to us that it is often. But when we consider the matter further the conclusion follows that the loss of life or limb on the railways does not frequently occur.

"Thousands of passenger-trains are every day swiftly speeding on their way carrying their precious freight of human beings. Millions of people are carried for a greater

or less distance each week and yet how seldom it is that anyone is killed or injured. There is actually as much danger in walking the streets of a crowded city as in traveling from Boston to San Francisco. More people lose their lives in the city of New York in a single year by being run over by horses or vehicles than are killed in accidents on the rail.

"When the annals are prepared and a comparison made, it will be found that more are destroyed by lightning than by railways. The reason of this comparative safety is the perfection to which railway administration has attained. Track, locomotives, cars and appurtenances are of the most approved pattern, employés are skilful and alert so that the traveler rests as peacefully and safely in a Pullman sleeper, running at a rapid rate, as he does in his own bed at home."

Old-time Track.

IN the display of the Louisville and Nashville Railroad at the Southern Exposition, says the Louisville *Courier-Journal*, will be an interesting reminder of the railroad of our forefathers, and the dangers of fast travel fifty years ago will be contrasted with the safety of to-day. The reminder in question is a section of rail and foundation from the Lexington and Ohio Railroad, the second railroad built in the United States which used an iron rail. The rail is simply a flat piece of iron, with holes drilled through it to receive the spikes which attached it to the foundation. There was no such thing as a cross-tie, nor was there any need of one. The foundation was a slab of rock, perhaps two feet wide by one thick, and about seven or eight feet long. This was sunk into the ground, and holes were drilled into it for the spikes. The rail was laid on, the inner side of the stone being chiseled out to fit the flange of the car-wheel. There was but little danger of jumping the track, but the "snake-head" was in its glory, the spikes working loose and the rails turning up at the ends. The section to be on exhibition was dug up near Lexington on the 5th of this month.

Brain Work on Railways.

"M. QUAD" discourses thus to the American boy: "Have you any idea of the millions of money required to build, equip and run a railroad? Have you ever asked yourself how many locomotives, coaches, cars and men such a road as the Michigan Central must keep constantly employed? Did you ever figure on what a fortune it cost each year to keep up all this rolling stock, tracks, stations, tanks, etc.? And think of the perfect system that prevails in all the departments! No train leaves the depot until the gong strikes the exact minute, and from the time it leaves here until it reaches its destination it is under the watchful eye of the train-dispatcher, and all its movements are known through the telegraph. Go down to the depot at 11 o'clock, A. M. and ask the train-dispatcher where the train is which left for the west three hours before, and he will locate it. Every conductor has his orders. He must run by these until the telegraph makes a change. There is a continual click! click! of the telegraph all along the line, and if there are fifty trains on the rails each one makes its run without bothering another. There must be a perfect system, and men must obey orders to the very letter.

"Ride the length of a railroad and you see the piles of rails here, heaps of ties there, old car wheels and scrap iron by the acre, and you must imagine that great recklessness prevails in the financial management. No corporation cuts expenses closer than a railroad. Every tie is counted—every old car wheel has its value—every hundred pounds of scrap iron is looked after. On some roads the engineers are limited as to the amount of oil to be used each trip. It is even figured down just how long a wheel will run and how long an axle will last. People talk about the position of President of the United States as if it demanded great ability on the part of the incumbent. The active superintendent of a first-class railroad exercises five times the brain power required in any political office in the land. Think of the many stations along the route—the rolling-stock—the purchasing, selling and repairing! He may not burden himself with every detail, but he must see that others do. He must have the head to control others' hands."

Death of the Iron Rail Industry.

FROM 1878 to the present time, according to a statement in a recent number of the *Iron Age*, iron rails have been steadily falling in favor, with the exception of a brief interval in 1879–81, when the "boom" gave this dying industry a respite from its inevitable doom. The production of steel rails, on the contrary, advanced with prodigious strides from year to year until the maximum was reached in 1882, since which time the depression in trade that has so seriously affected railroad traffic has caused a falling-off. During this period prices fell to a lower point than ever before known in this country, though while the "boom" lasted they touched high-water mark. The following table shows the condition of the two divisions of the trade from 1878 to the close of 1883:

Years.	Iron rails produced. Net tons.	Steel rails produced. Net tons.	Price of iron rails. Currency.	Price of steel rails. Currency.
1878.....	322,890	559,795	$33.75	$42.25
1879.....	420,160	693,113	41.25	48.25
1880.	493,762	968,075	49.25	67.50
1881.....	488,581	1,355,519	47.12	61.13
1882.....	227,874	1,460,920	45.50	48 50
1883.....	64,954	1,295,740	Not quoted.	37.75

This table shows how greatly the iron rail industry has collapsed, the production in 1883 having fallen to insignificant figures, and quotations not being made in the leading rail markets of the country. It will be observed that, while steel rail prices were $18.25 per ton above iron rail prices in 1880, in 1882 the difference was only $3. It is very probable that if we could obtain the prices at which the few iron rails were sold that were made in 1883, they would be found to have been above the steel rail prices given for that year, as other iron products have not fallen proportionately with steel rails.

Novel Stock Floating.

THE *Railway News* states that the Government of Guatemala has hit upon an original method of raising money for the construction of an important and much needed

railway from the capital to St. Thomas, a seaport of the Antilles. The cost of the line is estimated at twelve million dollars, and the Government has determined to obtain the money by making every adult male citizen a shareholder to the extent of forty dollars. Those who are too poor to pay the lump sum will be allowed to discharge their obligation by ten annual payments of four dollars each. Unless there is extraordinary prosperity just now in Guatemala we fancy a good many "male adult citizens" will find it convenient to pay their quota by a process of long division.

American Locomotive Shops.

THERE are at present sixteen locomotive works in this country, not including the shops owned by railway companies. Pennsylvania has five of these, New Jersey and Massachusetts three each, New York two, Rhode Island, New Hampshire and Maine one each. These works give employment to 14,000 men, and every year add about 2,600 to the 20,000 now in daily use. At present five men have to work an entire year to complete one of these huge machines. The past year has been somewhat a dull one for manufacturers, and a majority of the shops are not working full time.

THE Government of India, which controls and operates the greater part of the railway system of that country, has determined to adopt iron freight-cars, and it is advertising for contracts to furnish 1,000 cars made of that material. The specifications published show that the American freight-car design has directly influenced the plans for the new India goods wagons, as they are called. They will be open cars, twenty-five feet long, and will be carried by two trucks. The whole of the cars will be of iron—trucks, frames, and upper work. All parts must be made interchangeable, and to standard sizes.

THE Philadelphia *Record* says that General Manager John E. Wootten, of the Philadelphia and Reading Railroad Company, who is the patentee of the Wootten dirt-burning locomotive, has sold his rights in the patent for a sum estimated between $250,000 and $300,000. The purchase was made by an association of railroad capitalists, who have formed a company, of which Mr. Joseph Wharton, president of the Wharton Switch Company, is the leading man. The purchasers will continue the manufacture of the locomotives under the title of the Wootten Locomotive Company.

THE locomotives of the German Railroad Union in 1862 consumed, among other fuels, 49,827 tons of peat. The Austro-Hungarian roads in the Union burned considerable wood—209,918 cubic meters, against 973,316 tons of lignite and 655,708 tons of coal. On the German roads 97 per cent. of the fuel used (reckoned by heating capacity) was coal; on Austro-Hungarian roads 53⅓ per cent.

THE Massachusetts Bureau of Statistics states that in 1868 the chance of a person being killed on or by steam-cars was one in 5,026,281, while in 1882 it had diminished to one in 20,927,034. This is less than the chance of being struck by lightning, and much less than that of being injured by a kerosene lamp explosion.

Correspondence.

THE MASSACHUSETTS CAR-COUPLING EXAMINATION.

[SPECIAL CORRESPONDENCE OF THE AMERICAN RAILROAD JOURNAL.]

BOSTON, MASS., October 2d.

THE Massachusetts Board of Railroad Commissioners met here on September 25th for the purpose of carrying out their projected examination of car-coupling devices, and they are now preparing their report. There were, in all, one hundred and seventy-five entries made of patent coupling devices, but of this total ninety-five did not exhibit, and the actual number submitted was eighty. Models continued to arrive after the exhibition had terminated, and though not examined by the Board as yet, they will probably receive attention as soon as the members have finished their present arduous duties. I append a complete list of the car-couplers exhibited, and of persons exhibiting car-coupling devices:

Ames' Automatic Car-coupling, Boston; Adams & Felthausen's Self-acting Coupler, Albany, N. Y.; Archer Automatic Coupler, Albany, N. Y.; American Automatic Car-coupler, Boston, Mass.; Burrell Coupler, Camden, N. J.; Barnes Automatic Coupler, Rochester, N. Y.; Bert Car-coupler Company, Denver, Colorado; Thomas F. Byron, Lowell, Mass.; Brown Automatic Coupler, Louisville, Ky.; Coon's Coupler, Boston, Mass.; Beal Coupler, Fernandina, Fla.; Boston Automatic Coupler; Bias Car-coupler; Beacher & Holmes Car-coupler, Moncton, N. B.; George F. Blood, Troy, N. Y.; James W. Cole, Westfield, Mass.; Carsonville Coupler, Abilene, Kansas; Conway Ball Coupler, New York; Chas. K. Cordrey, Bellefontaine, Ohio; Cowell Coupler; Davis & Barnes Cannon-ball Coupler, Abilene, Kans.; Chas. Devlin, Pembroke, Ontario; C. A. Drake, London, England; Davidson's Coupler, Boston; John Depew, Peekskill, N. Y.; Eureka Coupler, Grand Rapids, Mich.; W. L. Everett, New Era Car-coupler, New Haven. Ct.; C. F. Edwards, Tipton, Mo.; Fisher Universal Automatic Car-coupler, Wabash, Ind.; W. H. Flag, Mittineague, Mass.; Hugh Graham, Dartmouth, Nova Scotia; Giffard Automatic Freight-car Coupler, New York; Lyman Hatfield, Manley Howe's Coupler, Boston; Thayer's Assistant Coupler for coupling with link and pin; A. B. Holmes, Scranton, Pa.; Hine Coupler; R. Hitchcock, Springfield, Mass.; Chas. M. Hoag, East Albany, N. Y.; G. P. Hunt, Newark, N. J.; M. R. Hubbell & Co., Wolcott, Vt.; John J. Howe, Janney Coupler, Pittsburg Pa.; Marks' Automatic Coupler, Cleveland, O.; Miss Susan P. Moulton, Salem, Mass.; James McCarn, Lansing, Mich.; Manlick's Automatic Coupler, Beaver Falls, Pa.; Henry Mitchell, Boston; T. B. Nutting, New York, N. Y.; S. Nichols, Boston, Mass.; National Freight-car Coupler, Lynn, Mass.; John Raddin, Lynn, Mass.; Putnam, Hickok & Hickok, Buffalo, N. Y.; Peck's Car-coupler, Columbus, O.; Powell's Perfect Car-coupler, Kansas City, Mo.; Prescott's Automatic Coupler, St. Albans, Vt.; James Schofield, Marshall, Texas; H. M. Sturgis, South Charleston, O.; Skinner's Car-coupler, Flint, Mich.; Stebbins' Coupler Co., Hinsdale, N. H.; Walter Turnbull, New Orleans, La.; Turner's Coupler, Baltimore, Md.; L. G. Tompkins, Lake City, Iowa; United States Car-coupler Co., Boston, Mass.; Union Car-coupler, Boston, Mass.; Universal Automatic Coupler, Raleigh, N. C.; Vance Automatic Coupler, Cincinnati, O.; A. C. Woolman, Robinson Car-coupler, Bellefontaine, O.; Thomas Woods, London, Eng.; Williams' Coupler, Brattleboro, Vt.; Wilson & Walker Coupler, Pittsburg, Pa.; P. Ware, Boston, Mass.; B. C. Brehant, Moncton, N. B.; Geo. F. Bond, Troy, N. Y.; J. R. Titus, Huntington, W. Va.; L. S. Colburn, Oberlin, O.

The Commissioners had a busy time and performed their duties in a fair and impartial manner. The attendance was large, and the best authorities in the country on car-couplers were present. As to the merits of the couplers exhibited, they may be said to have ranged from the highest to the lowest degree, and of course the latter predominated. I say "of course," for the reason that but very few inventors understand the requirements of a safety coupler, and are ignorant of the forces that tend to the destruction of couplers. It is not a difficult matter to construct a model of a coupler that will couple automati-

cally, and this has been done in thousands of ways, and they will act very nicely on a table, and are not bad things to play with. They will not only amuse children, but also men who have grown grey in car-practice. Perhaps the most noticeable feature of the show was to see a dozen or so of the "old-timers" in railroading spend a long time in discussing the merits of a device that bore on its face the evidence of worthlessness. It is a difficult matter to have inventors of couplers understand that couplers will not admit of complicated or delicate parts. The nature of the service they are to perform causes their rapid destruction, and no device that can become deranged or unreliable will be acceptable under any circumstances.

Although there were several automatic couplers that had some features to recommend them to consideration, it may be regarded as certain that but few if any of them will ever come into general use. The thing is getting simmered down to a fine point, and, although there may be some automatic couplers brought into use, they will very likely be those that will couple with link and pin. There is an effort on the part of some "shovers" of automatic couplers to crowd out the link-and-pin coupling, and they brace up their argument by parading the cost of replacing broken links and pins which they say is enormous. They propose to remedy this by forcing the railways to adopt their expensive automatic (so-called) arrangements that do not couple with link and pin. The frequent breakage of links and pins is a good "bracer," both for officials who are paid for their influence and the men who seek their patronage. But if any one will take the trouble to visit some of the shops where links and pins are made by the hundreds of tons, he will discover the cause of so many failures of these coupling attachments. He will see that these links and pins are made of very cheap and poor material and are turned out in the most expeditious manner by machinery. If the material was of a fair quality in the start it is spoiled by being burned by over-heating so as to make it work easily under the forging process. In this way the railways are equipped with pins and links so brittle that breakages are frequent and disastrous. It is considered economy by some railway managers to purchase these appliances at the cheapest possible rates, and this is the primary cause of accidents resulting from failures of these couplings. Some two or three years since I inspected a large pile of broken links and pins and discovered that the material was of very inferior quality, and wholly unsuited for the purpose. Pins and links of proper dimensions, made of good, honest, tough iron, will rarely, if ever fail, and the frequent breakages are only trumped up as an excuse for adopting some other form of coupling where there is more "margin." Indeed, it is these margins that stand in the way of many, if not all good devices for coupling, and is the mountain in the path, which must be removed by the railway commissioners and car-builders before a satisfactory solution of the coupling problem will be reached.

But the Massachusetts Commissioners are laboring earnestly to bring about a reform in car-coupling, and there is an indication that they are not laboring in vain; and it is confidently expected that by March next, the railways and the public will be enjoying the benefits of safety car-couplers.

WM. S. HUNTINGTON.

A Plea for Civil Engineers.

To the Editor of the American Railroad Journal:

DEAR SIR—Not very long since, in the pursuit of professional business, the writer chanced, with several other passengers, to be detained at a railroad station through the many long, weary hours of a winter evening waiting for a delinquent train. We all found some cheer before a blazing wood fire in an adjacent restaurant, and conversation upon various subjects served to while away the time. I should say that this station was in one of our Southern States, and there was one fine-looking old gentleman there whose tongue ran the smoothest and longest, but he was mostly eloquent upon the subject of the late war. A lone Northerner would prudently keep his hash-trap pretty quiet under such circumstances, and take but little part in the talk, and have little to say. However unpleasantly some of the sentiments expressed might grate upon his feelings, our speaker, like the rest, became tired and dozy, and the quiet was suggestive of sleep, when all were startled by his sudden and stentorian announcement, addressed to the host of the eating-house, that he was a minister of the gospel, and hungry, and that he wanted some supper, and he wanted it at half-price! Whereupon he was kindly invited to a meal at that figure without much hesitation. The writer then felt the pangs of hunger also gnawing at his vitals, and suggested to the publican that as he was a civil engineer, far away from home, and traveling about the world, and doing a big heap of good, he also felt that he should have his supper at half price also. He was as cordially invited to the table, but, not having obtained sufficient data in advance, upon which to base an estimate, was unable to determine whether he paid half-price for his supper or whether he got only half a supper.

This little incident has caused this engineer to reflect, and to draw a parallel between the two professions, and to inquire why it is that a preacher should get such a liberal discount, when we have to pay the list price. We certainly have to work harder, when employed, and we are deprived of many of the social and pecuniary advantages which attend his calling. We, however, on the other hand, have no donation parties, and are not forced to accept gifts of a doubtful value in duplicate or triplicate, etc., which we do not need or want, and which are unsalable in any market; and we do not have to go with the variety show business, and ice-cream and strawberry festival business in order to further our schemes, and promote the building of public works. But then again they have one great advantage over us; very few engineers can hope to lay up a sufficient sum to allow them to pass their old age, and the infirmity which usually attend the last years of one who has led a life of exposure, hunger and anxiety, in peace and quiet.

No writer or orator has proposed a society or asylum for aged and infirm engineers, while on every Christmas day collections are made in all the churches for the preachers who are on the retired list.

Therefore as our necessities are fully as great, and our merits and virtues perhaps even greater, there should certainly be a provision made for those of us that are no longer able to shoulder a tripod, and stake out railroads and corner lots, color meerschaum pipes and test whiskey. Those of us who are becoming grey and bald-headed should make an early and earnest effort in this direction, and see to it that we don't get left. The writer is thankful to the Southern clergyman who unconsciously has led to this train of thought, and the consequences which may arise from its suggestion.

Let us, brethren, bestir ourselves and endeavor to organize a society of a similar kind for the unfortunate and impecunious who swell our ranks. Let us work with zeal, fervor and unction. "Tarry not by the wayside," balancing your levels but disregarding your hind sights, cut the bottom of the rod at every lick with your forward sights, and you will soon mount onward and upward, and our labors will be rewarded in our declining years by comforts and luxuries of which most of us have hitherto been totally ignorant.

I. PONTIFEX, S. I.

An Anecdote of "Old George."

WHEN coals were first carried by railways on the then London and Birmingham line, they were sheeted down for fear they would be seen, it being thought beneath the dignity of a railway company to carry minerals. An indignant objection was at first made to their being carried at all, and it was reported to George Stephenson that Mr. B——, of the London and Birmingham line, had said: "They will want us to carry dung next." On hearing this, "Old George's" anger was aroused, and he replied, "You tell B—— from me, that when he travels by rail they carry dung now!"

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STILL AGAIN.

FOR the fifth time we would call attention to the fact that the AMERICAN RAILROAD JOURNAL stands alone among all railway publications as a monthly magazine and review. Able contributors discuss the current railway topics in its columns, and a selection is made, in every number, of several interesting articles from its contemporaries. We believe that this publication is now filling a void that has long existed, and that the railway world is of sufficient importance to be furnished with other publications than mere technical, financial and news journals.

An examination of the numbers of the JOURNAL from that of June up to and including the present, will show that twenty-two contributed articles have appeared in its columns on subjects of contemporaneous interest, furnished by competent writers. Our staff of contributors continues to widen but we are always ready to examine contributions on railway and tramway subjects irrespective of their authorship, and if they are well-written and of interest to our readers, we will accept them and forward payment for them upon their publication. The invitation thus extended to aid in making the JOURNAL a valuable magazine for railway and tramway men, is addressed to every reader; and its acceptance may be entered into with the knowledge that all satisfactory labor will meet with honest remuneration.

A USEFUL DISTINCTION.

OUR valued contributor, Mr. W. W. HANSCOM, takes us to task in a recent letter for our distinction between the signification of the terms "traction" and "propulsion" as exemplified in an editorial in the Tramway Department of the July JOURNAL contrasting the two motive forces. He says:

"I received the JOURNAL for July and note your article on 'Traction or Propulsion.' I judge that you consider my use of the term 'Propulsion' in reference to cable railways as not strictly correct, and that it should be 'Traction.' I am satisfied that I was wrong in using the word 'Propulsion,' as I find by Webster that it means pushing, while 'Traction' means pulling.

I had been much accustomed to the use of the word in connection with the construction and movement of vessels, propellers, etc., and used the words in a general sense without exercising any intentional care with reference to the meaning of words used, but permit me to inquire as to whether any train of cars, or a single car is not drawn, whether the motive power be a horse, locomotive or stationary engine. In one case, that of the horse, the connection between the motive power and the car is that called the traces, which corresponds to the coupling or draw-bar between the locomotive and car, and in the case of cable railways the connection between the motive power and car is the cable. In two cases the motive power moves, and in the other it is stationary. The cable is not the motive power any more than the traces for the horse or the coupling for the locomotive. Now I should say that if you put the horse or locomotive behind the car you might propel them, as I understand Webster's definition; or a screw propeller, or paddle-wheels propel a vessel, or a locomotive propel itself, or a horse propel himself, or a man by pushing a wheelbarrow, propel the barrow by pushing. The cable is not the motive power in the general acceptance of the term, as we apply that to the engine and boilers. All articles that I have seen in reference to the force exerted by a locomotive to draw or move a train of cars speak of it as tractive and not propulsive force, and I cannot see that a steam-dummy is a fair

example of propulsion as a motive power for tram-cars. If your article was intended as a distinction between cable and locomotive, or horse, in using the word propulsion, one being propulsion and the other traction, I must beg leave to differ from you."

It is quite possible that competent authority would sustain Mr. HANSCOM in the position he has taken with reference to the signification of the two terms. Strictly speaking, a steam-dummy is a power of traction as well as a cable or a team of horses, since it pulls the car behind it, but it was not in that sense we used the term as contradistinctive to traction. It is the *sine qua non* of traction that the power should be in advance of the vehicle, and thus it is undoubtedly true that a locomotive is tractive when applied to the carrying of cars, but is at the same time propulsive when it is considered alone. A locomotive propels itself and it is evident that it would be absurd to speak of it as pulling itself. In propulsion it is an essential that the vehicle must carry the power with it, and under this definition it is manifest that a cable could never be a method of propulsion. Steam, springs, hot air and electricity—even wind and water can act as propelling forces, but we fail to see that a rope, or cable, or a horse could act in this capacity. It is also true that all of the first named forces can be tractively applied, but in order to accomplish traction they must first be given a propulsive action. Thus a cable road is operated by a tractive cable and this cable is operated by a steam-engine, but the engine must first be propelled before the cable is given the power of traction. A locomotive pulls a train of cars but it must first propel itself before it furnishes a tractive power. But the direct action of steam and electricity and other of the first-named forces is propulsive while the action of cable or horse is invariably tractive.

In the case of the steam-dummy and of the locomotive we are given two familiar examples of purely propulsive forces; but when before a car or a train of cars they are tractively applied. On the contrary, when in the rear of a car or a train of cars they are propulsively applied. But from whatever point they are viewed a cable or a horse is purely tractive in its action. The force is invariably exerted backward and the vehicle is behind the power. Propulsion acts *from* a point and traction *to* a point. We know no simpler epitome of the difference between the forces.

There may be little gained in the preservation of this exact distinction, conversationally applied, but there is much utility in bearing this distinction fully in view. As before stated we look for little further results from the investigation of traction save in the details of its application. Traction requires a preëxisting force and this force is generally propulsive. To us it seems that the chief results are to follow the direct application of propulsive force without an intermediary tractive application.

We admit Mr. HANSCOM'S criticism to be just when he alludes to the use of the word propulsion as applied to a steam-dummy attached to a tram-car as incorrect according to our own definition; but the steam-dummy in itself is a purely propulsive power and it was in this sense that we spoke of it. We also claim that the use of the word propulsion as applied to a cable road or horse road can, under no circumstances, be correct, and this claim Mr. HANSCOM candidly allows in the first portion of his letter. In this position we are etymologically sustained. Propulsion is derived from the Latin *pro*, forward or ahead, and *pellere*, to drive, while traction is a simple derivative from the Latin *tractere*, to draw or pull. The distinction between these terms as applied to motive power is, to say the least, advisable, and the application of the word propulsion should be strictly limited to those motive powers which come within the requirements stated above.

THE MASSACHUSETTS CAR-COUPLING EXAMINATION.

IN another column a special correspondent of the JOURNAL reports the examination of car-coupling devices by the Massachusetts Board of Railroad Commissioners on the 25th of last month. As yet the Commissioners have not prepared their report, and we are a little in doubt as to the precise turn it will take. Evidently they cannot demand that any one of any number of couplers shall be adopted by the roads under the jurisdiction of the State, and the utmost limit of their power would seem to be reached when they endorse certain couplers as possessing the necessary requirements, and recommend their adoption. Beyond this it strikes us as impossible for the Commissioners to go, and this limit of power is commendable. It is eminently proper for a State to prescribe that all railways under its jurisdiction should employ safety couplers on their cars, and it is also permissible for the State authorities to rule out certain devices as not filling the requirements of safety; but it would be manifestly wrong were they given the power to compel the railways to adopt such devices as they—the authorities—may deem the best. It is fair to presume that railway managers are more capable of discerning the merits of the devices than the Commissioners themselves, and it is also just to assume that they would be quick to adopt measures to secure safety to their employés.

With this limit of power it is somewhat difficult to see the precise benefits which will accrue from the long-talked-of examination, other than the demonstration of the utter impracticability of the great majority of coupling devices; but if this end alone is attained the labors of the Commissioners will not go for naught. Railways have long suffered under the infliction of the car-coupling mania, and the ordinary inventor seems unable to comprehend the fact that an automatic coupler is not the chief desire of every railway to obtain. Any intelligent railway mechanic in the space of half-an-hour could devise a dozen

car-couplers all of them superior to the majority of devices that every week litter the pages of the *Patent Office Gazette*, but the fact remains that the primitive link-and-pin coupling is the best in the world in theory. It is not essential that the coupling shall be *automatic*, nor in fact would such action be regarded as very desirable. The chief end desired in a coupler is that it shall be *safe*, and thus these patents which have for their object the application of the link-and-pin coupling in a manner that will insure safety to the train or yard-hand conducting the operation, seem most likely to reap a harvest for their proprietors.

The Massachusetts Commissioners have doubtless been edified by the examination of coupling devices of varying degrees of merit, but we should think that they would be puzzled in making a report. They may recommend a dozen or two of the most meritorious devices that were submitted to them, but they must be aware that any railway could provide equally good devices without the necessity of paying a royalty for their use. In fact, the chief benefit resulting from their examination will be the awakening of interest in the subject of safety couplers and the doing away with the vain search for an automatic coupler that will be adopted by every railway regardless of its cost, which seems to have been the El Dorado of railway inventors.

MR. HENDRICKS'S GRAND ACHIEVEMENT.

SOME months ago we announced the JOURNAL'S strict neutrality in the Presidential campaign, and under ordinary circumstances we would have pursued the even tenor of our way, undisturbed by the political clamoring of the multitude, had not a candidate of one of the great parties performed a deed that not only wins our warmest admiration but carries us enthusiastically to his support. We allude to the Hon. THOMAS A. HENDRICKS, of Indiana, the Democratic candidate for Vice-President of the United States.

The act in question was simple and unostentatious. In performing it this truly great man little thought that the deed would call forth the admiration of two hemispheres, and that from that moment he would become the cynosure of the eyes of *savants* throughout the civilized world. To state in brief the marvellous achievement of Mr. HENDRICKS, we will simply refer to a telegraphic despatch recently received from Ohio, announcing that while awaiting a train in a railway station, he deliberately ate three sandwiches at the adjoining restaurant.

The railway sandwich has long been recognized as one of the most deadly substances in existence. HERODOTUS mentions the fact of one being eaten by a Grecian warrior who survived, but the narrative is commonly supposed to belong to an age of legend and is not generally accepted as true. There was even mention of a similar case supposed to have occurred in Massachusetts as late as 1834, but this, too, is viewed in the light of a newspaper story and is doubtless purely without foundation. To Mr. HENDRICKS belongs the undisputed honor of being the first to accomplish this wonderful achievement before witnesses, and with authentic proof.

The existence of the railway sandwich and its spread throughout the country has long been a source of terror to the people and of anxiety to the medical fraternity who have been able to cope with it successfully. The railway companies claim that they have done their best to stamp out the germ, but this statement is received with doubt, and it is even hinted that they have wilfully contributed to the spread of the pestilence, and should be severely punished for their malignity and premeditated slaughter. Certain it is that during the year 1883 there were 8,760 authentic cases of death recorded from the railway sandwich, and if the railways are guilty of the infamous crime imputed to them, they should be remorselessly punished.

The investigation of the peculiar properties of the railway sandwich has long been the study of scientists. Professor DOREMUS, of this city, recently gave the following analysis of its ingredients in one hundred parts:

Leather	79.06
Vitalized Marble	18.17
Bread	2.76
Ham	.01

He concludes his analysis with the remark that "the railway sandwich is the most fatal substance known to science, and as yet there has been found no antidote that will avert its fatal effects." Professor DANA, of Yale College, the noted authority on arsenical poisoning, has also entered into an investigation of the railway sandwich and his analysis shows slightly different results from that of Professor DOREMUS, in giving an increased preponderance of leather, and a "slight trace of butter." Like his brother scientist, Professor DANA announces the railway sandwich to be "a substance which when taken into the human system is absolutely and unvaryingly fatal in its action."

Up to the present time Mr. HENDRICKS has shown no ill effects from his daring feat, and it is currently thought that he will survive. If such be the case there can be no further question as to his fitness for the exalted position to which he has been nominated. A man who shows such superhuman courage is preëminently accoutred for the task of controlling this vast commonwealth, which is a contingency of his election, and unless his Republican rival, General LOGAN, can match this accomplishment by an equally daring act, we give our hearty support to the great and only HENDRICKS. To this extent we retract our original position of neutrality and gladly enter the political arena.

EDITORIAL NOTES.

THE refusal of the Pennsylvania Railroad to allow the Baltimore and Ohio to run their through trains over the former's tracks after the 12th of the present month is the latest development in connection with the complex relations of the two roads. It is thought that this action will hasten the arrangements of the Baltimore and Ohio to connect their line with that of the Philadelphia and Reading, and thus reach New York by way of the Jersey Central Division. Whatever may be the outcome, an active railway war is promised and the situation is one of lively interest.

* * *

THE conference of scientists now being held in Washington to determine upon the adoption of a universal prime meridian of longitude, is rightly attracting attention from every civilized country. The absurd practice now in vogue of nearly every nation reckoning longitude from its own capital or from some prominent point in its own territory cannot be too quickly discontinued, and in the interest of navigation it is to be hoped that a single standard meridian will be adopted by every civilized power on earth. This is not the occasion for the exercise of miscalled patriotism, and there seems to be no reason why all nations should not adopt the Greenwich standard. From the extent and diffuseness of British territory as well as from the rank and importance of the British nation, it is eminently proper that their standard should meet with general adoption. It is understood that France will make it the condition of her adoption of the standard meridian, that the metric system of weights and measures shall be adopted by other nations; but while the metric system is infinitely the best ever devised, it does not strike us that this is the time nor the place to urge its adoption, and above all to employ it as a condition of the establishment of a standard meridian of longitude. Another commendable feature of the conference is the proposition to do away with the suffixes "East" and "West," and to reckon longitude entirely in one direction. Thus there would be three hundred and sixty degrees of longitude, the degree of 0 and that of 360 coinciding. This would be a common-sense improvement, and its advantages are manifest.

* * *

THE Sons of the Revolution, an organization composed of the descendants of those who fought for the independence of the United States, have actively undertaken the task of collecting funds for the completion of the Bartholdi Statue pedestal. So far they have met with encouraging success, and several thousand dollars have been turned in for this laudable purpose. The Sons of the Revolution have gone about the matter in a sensible way and are personally soliciting small subscriptions. It is a national humiliation that the pitiful sum needed to complete the fund should be so difficult to collect, while thousands and even millions of dollars are poured into the treasuries of political parties for "campaign expenses;" but we feel assured that the necessary money will be raised by the time the statue is ready for erection. Were the statue to be brought to this country and placed where it could be seen as a constant reminder of our stinginess, we believe the people would be shamed into subscribing the necessary amount in a very short space of time.

* * *

AMONG other successful railway conventions held last month, was that of the Master Car-Painters' Association, in Boston. This organization is rapidly gaining in strength and membership, and deserves the hearty coöperation of the railways. Car-painting has now become an art by itself, and the discussion of methods by the leading car-painters of the country cannot fail to be of benefit from an artistic as well as from an economic point of view.

* * *

ENTERPRISE is indeed thriving among car-builders when they come to building passenger-cars with bay-windows. Such cars are now being built for the Pennsylvania road and we presume will soon be quite common. In time, we suppose, Queen Anne cars will be introduced, and the good work will go on until the passenger-car will be a miniature residence and the compendium of all convenience. Then will come theater-cars and opera-cars—there are already church-cars—and gradually the American people will conclude to live on the rail. Truly this is a great age we are living in.

* * *

THE Court of Appeals of New York State has confirmed the decisions of the lower courts in the suit brought against the trustees of the Brooklyn Bridge for damages resulting from the fatal blockade of May 30th, 1883, and a half-million of dollars is thus supposed to have been saved the trustees in the avoidance of litigation and payment of damages. There was no evidence adduced tending to show that the trustees had been derelict in their duties as regarded their placing a proper police patrol on the Bridge, but a fine opportunity is nevertheless afforded for the blatant anti-monopolist to pour out his vituperation on another "grasping corporation."

* * *

THE public are at present very much interested in the war of rates that the Western trunk lines have recently inaugurated. Naturally the public are the sole gainers by the warfare and the bigger the fight the better they are pleased. One of the great mysteries to the uninitiated is the precise advantage which railways obtain in a slaughter of rates, but so long as the corporations are the losing parties there is little complaint.

Tramways.

American Street Railway Association.

President.—William H. Hazzard, Brooklyn, N. Y.
First Vice-President.—James K. Lake, Chicago, Ill.
Second Vice-President.—George B. Kerper, Cincinnati, O.
Third Vice-President.—D. F. Longstreet, Providence, R. I.
Secretary and Treasurer.—William J. Richardson, Brooklyn, N. Y.
Office of the Association, cor. Atlantic and Third Avenues, Brooklyn, N.Y.

THE "JOURNAL" AND THE AMERICAN STREET-RAILWAY ASSOCIATION.

OF all the numerous railway publications, the AMERICAN RAILROAD JOURNAL is the only one that has steadily devoted a liberal portion of its pages to the consideration of street-railways and the numerous problems and questions relative to their proper conduct and management. The establishment of our Tramway Department ante-dated the formation of the American Street-Railway Association and during the existence of this organization we have been quick to chronicle any items of news connected therewith, and to place before its members the latest and fullest information concerning tramway progress that could be obtained. We have published in full, the reports of the Conventions, and in numerous editorials have advocated membership in the Association. A talented staff of writers have contributed articles on all those subjects directly appertaining to tramways, and we have fully described the latest and most useful tramway devices lately devised and patented. Elaborate articles have appeared on the subject of Street-car Painting, and the new Cable Traction System has been fully described in our columns in an illustrated series of articles on the subject by the leading tramway engineer of the country. This latter series is completed this month and we have made arrangements for the appearance of an illustrated descriptive article on the Electric Motor System, to be prepared by a practical electrical engineer. During the year past the JOURNAL has been favored with a number of communications from prominent persons connected with tramway management, and several columns of notes, and items of news and interest have also appeared.

Beginning with the JOURNAL for October, 1883, one year ago, an examination of that and the successive numbers up to the present will show that in all we have devoted *seventy-five pages*, or *one hundred and fifty columns* to our Tramway Department, an average of nearly *twelve columns in every issue*. During that same space of time *forty-five illustrated cuts* have appeared in our columns relative to tramways, nearly all of which were prepared expressly for our columns and at our own expense. The Department for October, 1883, commenced with an editorial leader relative to the then recent Convention of the American Street-Railway Association, and following, came several editorial notes, a paper on the Cable System, a communication on the Philadelphia Cable Road, a description of an old Car Grip, a full report of the Convention of the Street-Railway Association covering six pages, a list of patents granted during the preceding month for tramway devices, a communication from our valued correspondent, Mr. A. W. WRIGHT, of Chicago, a number of tramway notes and items, descriptions of a patent street-car fender, turn-table, horse-shoe, three car-starters and a harness saddle. The November JOURNAL contained in its Tramway Department a number of brief editorials, the first of a series of valuable illustrated articles on Street-car Painting which continued through four numbers, an interesting comparison between English and American Street-Railway Construction, several communications, and a number of illustrated descriptions of tramway patents. The succeeding numbers up to June of the present year devoted equal space to the Tramway Department and presented numerous illustrated articles on Street-car Painting, Tramway Traction, Track-construction, Tramway Inventions, and many columns of tramway news and editorial comment,

With the June issue of the present year, the JOURNAL passed into different hands, and a renewed interest was taken in the subject of tramways. The Tramway Department of the June number contained an editorial advocating the construction of Tramways in lower New York City, the first of an illustrated series of articles on "Cable Railroads" by Mr. W. W. HANSCOM, of San Francisco, the competent engineer in charge of the construction of the new cable tramway in London—which series is completed with the present number, having run through five successive issues and been illustrated with twelve cuts—articles on a New Tramway Locomotive, British Tramways, a Skidless Tram-rail, the Market Street Cable Road in Philadelphia, and a number of tramway news notes. The Tramway Department of the July JOURNAL contained an editorial on the subject of Traction or Propulsion, a further editorial on Cross-Town Tramways in New York City, the second illustrated installment of Mr. HANSCOM'S series on Cable Roads, a communication on the subject of Steel Rails, articles on the subjects of Glass Pulleys for Cable Roads and Tramways in France, with numerous tramway news items and notes. The Tramway Department of the August JOURNAL contained an editorial on the subject of the proposed Surface Road on Broadway, the third illustrated installment of Mr. HANSCOM'S series of contributions, a description of the new Electric Tramway in Cleveland, and of the new Cable Tramway in London, a brief mention of the action of the authorities with regard to the Broadway Surface Road, and the usual installment of tramway news in the form of notes. The

Tramway Department of the September JOURNAL contained an editorial on the subject of the approaching Convention of the American Street-Railway Association, another on the Broadway Surface Road Franchise, the fourth illustrated installment of Mr. HANSCOM'S contributions, the report of an interview with Secretary RICHARDSON relative to the approaching Convention of the Street-Railway Association, a report of the second annual Convention of the Street-Railway Association of the State of New York, a description of the electric tramway at Coney Island, an item regarding Mr. CORBIN'S offer to the cities of New York and Brooklyn to operate the passenger railway of the Brooklyn Bridge, and the customary tramway news notes. The present issue of the JOURNAL speaks for itself, and it is unnecessary for us to enumerate the contents of its Tramway Department. During the entire period since October of last year the names of the officers of the American Street-Railway Association have been kept standing at the head of our tramway columns.

Upon our Tramway Department we have expended more time and trouble, and been put to more actual expense than upon any other department of the JOURNAL, while the receipts directly traceable to this department are immeasurably smaller than those from any other. In truth the maintenance of the Tramway Department of the JOURNAL has cost more than it has brought in the way of legitimate business, and it has been, and is still being conducted at an actual loss. Nevertheless we have no intention of discontinuing it, for there is every indication that it has met with a *succes d'estime*, if no other, and we honestly believe it is of the greatest benefit to the members of the American Street-Railway Association and to tramway managers and officials throughout the country. All that is asked is that our labors and efforts in behalf of tramway interests shall be recognized by the substantiation of our claims to be the organ of American tramways. We seek for no subsidy nor do we ask that a certain sum be granted in the way of subscriptions or advertising, but we do request that all those tramway managers and officials who deem our Tramway Department to be of value will recognize the AMERICAN RAILROAD JOURNAL as the organ of their interests. There are probably other publications that might claim this distinction as properly belonging to them, but we will only too cheerfully submit to a contrast of our Tramway Department with their own. The JOURNAL was the first publication to recognize the interests of street-railways by the establishment of its Tramway Department, and it is likewise the only railway publication to-day that is consistently maintaining its department from number to number and possessing a regular editorial and contributing staff of writers for this department. With regard to the American Street-Railway Association, the JOURNAL is preëminent in the fact that it was the first publication to recognize the Association as a factor of great interest and value to American tramways, and the only one that has kept its existence in the minds of its readers by frequent editorial comment and news items.

If we have been able to substantiate our claim to be the virtual organ of the American tramways, our end is accomplished. We believe that if this fact is established, the JOURNAL will receive an actual endorsement as their official organ and that of their National Association, but should we be mistaken in this surmise it will make no difference in our future course. The JOURNAL will continue to be the virtual organ of tramway interests even if it fails to receive the official recognition which it deserves.

STREET-RAILWAYS IN THE COURTS.

AN interesting feature of the work performed by the American Street-Railway Association during the past year is the preparation in brief of a number of judicial opinions and decisions affecting the interests of street-railways in the United States and Canada. Through the courtesy of Secretary RICHARDSON, we have been furnished with a complete file of these decisions as published by the Association, amounting in all to seven.

As might be expected the street-railways are the defendants in the majority of cases, there being but one instance where the corporation is on the aggressive. In every case where the street-railways are the defendants, suit is brought for personal injuries resulting to the plaintiff, and in each case a judgment favorable to the corporation was rendered. We desire no better evidence to demonstrate the irrational character of the warfare which the public wage against corporations, and the absurd theories prevalent that injuries resulting through the carelessness of the injured form a case against the street-railway companies. The one case in which a street-railway is the plaintiff, is an action against a teamster for obstructing the company's tracks, and the judge's charge is given in favor of the company.

The papers are prepared with care and at the expenditure of considerable time and money, and they have been forwarded to every street-railway company in the country irrespective of whether they were members of the association or not, but we understand that this wholesale distribution is to be discontinued in the future, and very properly so. Every street-railway is interested in these cases, and if they desire to profit by the distribution of the opinions and decisions they should acquire membership in the Association and thus contribute to this and and other beneficial undertakings which the organization is maintaining. The expense attending such membership is very small, and entirely out of proportion to the bene-

fits which will accrue from a union of street-railway interests, and with this fact in view the apparent slowness of the companies to join is a matter of surprise. As a simple investment, a membership in the Association is certain to realize ample returns.

QUAINT old Philadelphia has at last been caught by the spirit of reform and the reduction of street-railway fares from six to five cents is being actively agitated in that city. Several companies announce themselves as ready to make the desired reduction, and of course it will be but a question of a very short time before the others follow suit. We believe that this reduction would be a wise move for the Philadelphia roads to make. It is essential that the fare upon a city road patronized regularly twice a day by thousands of persons, should be an even sum; and it has been demonstrated time and again that a uniform fare of five cents on the street-railways of populous towns is the most profitable figure for the companies. Philadelphia has in all probability as many miles of street-railway in active operation as any city in the country, if not more, and considering its size and importance it has been decidedly slow in introducing the five-cent fare.

* * *

THE abolition of bells upon tram-car horses is being considered by the authorities, much objection to them having been manifested, especially in large cities. We should not suppose that tramway managers would oppose their abolition, for the tramway bells are an undoubted nuisance and of the smallest possible benefit either to the roads or to their patrons. Upon tramways that run a dozen or two dozen cars an hour, the use of bells is entirely superfluous.

CABLE RAILROADS.

(*Concluded.*)

BY W. W. HANSCOM, M. E.

[Written for the AMERICAN RAILROAD JOURNAL.]

THE second cable road projected and constructed as such was the California street road, which has a length of about two and three-eighths miles. Its general arrangement of track and terminal provisions for switching, as well as the grip, were copied from the Sutter street road. The gauge of the track is three feet six inches. The tube is made of concrete, with skeleton frames—made from old rails—supporting the track and channel irons forming the slot.

Fig. 1 shows the general form and arrangement of the skeleton frame supporting the rails and slot-irons. These frames are put in place in the excavation and the slot-irons and rails are then fastened to them, while after being wedged up in line, mold-boards to form the interior of the tube are put down and the concrete filled and rammed between the mold and the bank, the thickness of the concrete being from eight inches to one foot. When sufficiently set to retain its form, the molds are removed from the concrete and placed along another section, when the operation is repeated. The form of the tube depends upon the shape of the grip and the room which it requires for manipulation. From just below the bottom of the channel-irons forming the slot to about the center of the sheave which supports the cable, its form as shown in the illustration, is that of an inverted cone, and the bottom part of the tube conforms to the shape of the wrought iron skeleton.

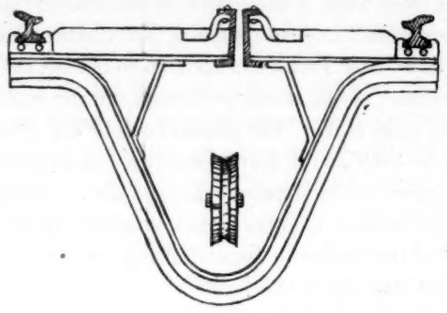

FIG. 1.

The driving-drums (which are like those used on the Sutter street road) instead of being placed in the engine-room, as on the Clay street and other roads, are located under and in the same vertical plane with the cable in the tube, the drums being connected by spur gearing to a line-shaft which extends to and over the engine-shafts. The cable is divided into two parts which meet at the engine-house, one part running East and the other West from the driving-drums. Tension sheaves for taking up the slack both from the incoming and outgoing sections of the cable were constructed for this road, and were intended to be automatic; but a short period of use demonstrated that sheaves for this purpose on the incoming cable were unnecessary, and the carriages supporting the tension sheaves were fastened in one position, leaving the automatic action to be performed by the sheaves on the outgoing section of the cable. This arrangement has been found to meet all the requirements.

There are two vertical engines with inverted cylinders, twenty-two inches diameter by thirty-six inches stroke, each with automatic cut-off, regulated by the governor. Each engine has a sliding pinion on its shaft which may be put into gear with a spur-wheel on the inner end of the line shaft which connects with the driving-drums. The piston speed is 528 feet per minute, which is the same speed as the cable, viz.: six miles per hour. The boilers, three in number, are of the locomotive fire-box style, and are arranged to connect either or all to the main steam-pipe. Only two are required for the work at a time, the other being in reserve, and a change of one boiler is made each week so that each boiler is laid off and cleaned every third week. The engines are not changed regularly, the one in present use having been run for a little over a year.

The grades on this road are heavier than on Clay street, and a larger cable is in use, being one and one-quarter inches in diameter. Various kinds of material have been made into cables for this road for the purpose of finding the most suitable and economical. Crucible steel cables have, so far, proved the most satisfactory,

The latest constructed cable road in San Francisco is that known as the Market street road, although it runs over five different streets. The route originally was through Market and Valencia streets, and the road was built in 1860, steam dummies being used for seven years, when they were abandoned and replaced with horses which were used until last year, when the cable system was adopted, and roads were constructed on Haight, McAllister and Fulton streets to connect with the Market street line. The diagram (Fig. 2.) shows the direction of the streets, with the location of engine-houses and turn-tables at the termini. The cables running through Market, Valencia and Haight streets are driven by the engines in the engine-house at the curve which joins Market and Valencia streets, and the cables running through McAllister and Fulton streets are driven by the engines at the angle formed by the intersection of these streets. The length of cable driven by the Market street engine is about 65,000 feet, while on McAllister and Fulton streets the engine drives about 25,000 feet, the cables being all one and one-

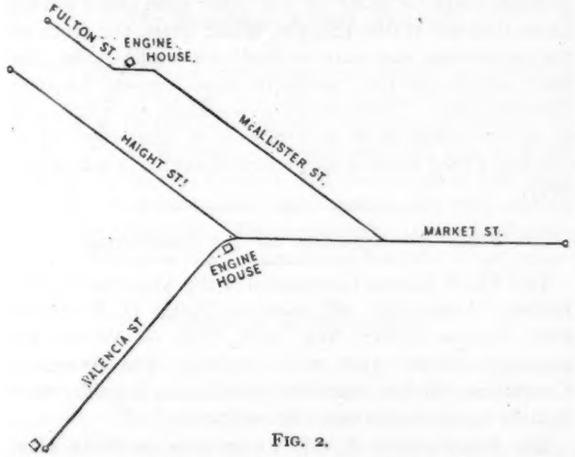

FIG. 2.

quarter inches in diameter. As the Market and Valencia street portions were converted while in use, the cost was greater than if new roads had been built, as temporary turnouts and switches were required. The lengths of the Market and Valencia street cables are together about eight and one-half miles, or about four and one-quarter miles of double track; the Haight street cable about two miles, and the Fulton and McAllister about two and one-half miles of double track. The cars for these roads are so constructed that the grip is placed at one end, and the cars are required to be turned round at each end of the route. Turn-tables having a double track are used, and one track being in line with the incoming track is brought in line with the outgoing track when the table has been turned half-way round. The cars themselves are partly open and partly closed, so that a passenger may ride exposed to the weather when pleasant, and in the closed and protected part when unpleasant or stormy. The cars are all turned at the lower end of Market street, as this is the point to which all the cars run from Fulton, McAllister, Haight and Valencia streets, and the other termini are at the ends of Valencia, Haight and Fulton streets.

The driving-gear and drums are the same in both engine-houses as those on the Sutter street road, but heavier, as the cable is one-quarter of an inch larger and there is much more of it. The engines for the Market street engine-house are the same kind and style as those on the Sutter street road, having been made by the same builders. The engines are compound, non-condensing, with diameter of cylinders twenty-four and thirty-four inches by forty-eight inches stroke, making fifty-four revolutions per minute; the gearing being so proportioned that with this speed the cables move eight miles per hour, or 704 feet per minute; the piston speed being 432. There are two sets of engines, each having a sliding pinion on the engine-shaft that can be put into gear with a spur-wheel on the line-shaft which carries all the driving-drums. The duplicate engines are for reserve, as on the other roads. The boilers are the Babcock & Wilcox—four in number—arranged in sets, two in a set, and either or both sets may be in use at the same time.

At the McAllister and Fulton street engine-house, two single engines are arranged so that either may be used singly, or both together; the cylinders are eighteen inches diameter by forty-eight inches stroke, and make fifty-four revolutions per minute, the same as those on Market street, and the cables run at the same speed. Four plain round tubular boilers are in use here for steam, set in pairs and connected as at other places so that either set may be used separately, or both pairs together.

These examples of cable railroads will serve to illustrate the advance that has been made in the method of moving street-cars. While there are yet many improvements to be made, and many changes in the detail to adapt this system to meet the varying local conditions and requirements, it has nevertheless proved a great benefit to San Francisco, and a safe means for conveying nearly twenty-five millions of people yearly; and has not only proved profitable to those investing in them, but it has added many millions of dollars to the taxable value of the property in this city. The same common sense and honest and intelligent management used in the construction of cable railroads that would be expected in the construction of any other railroad or manufacturing enterprise will surely bring due returns for the money invested.

DO SURFACE ROADS OBSTRUCT TRAFFIC?

BY F. MARTIN GAYLER.

[Written for the AMERICAN RAILROAD JOURNAL.]

WHILE in hearty accord, as a rule, with the position of the AMERICAN RAILROAD JOURNAL relative to the discussions of problems connected with tramways, I must take issue with it on the question of the obstruction of traffic on busy thoroughfares, by surface roads. The JOURNAL has conspicuously opposed the construction of a surface road upon Broadway chiefly for this reason, and in the last number it announces itself as fairly open to conviction as to the error of its opinions, but squarely states that it has not yet met the argument that will convince it. If permissible, I would like to undertake the task.

I do not, be it understood, argue in favor of the construction of a surface road on Broadway, in particular, nor will I enter at all into the absorbing questions as to the advantage of the sale or gift of the franchise for that purpose; but I take issue with the JOURNAL, or with its editorial writer who on that occasion spoke for it, on the im-

plied proposition made that a surface road upon a crowded thoroughfare was a hindrance to traffic. On the contrary I will as squarely lay down the broad proposition, and endeavor to give it satisfactory demonstration, that a surface road upon a crowded thoroughfare is a great aid and assistance to the maintenance of uninterrupted traffic. I will premise my argument by quoting a few lines from the editorial in the August number of the JOURNAL entitled, "Is a Surface Tramway on Broadway Desirable?" Its undesirability is chiefly claimed in the following sentences excerpt from the article in question:

"The casual observer cannot fail to note the frequent jams and blockades which daily occur on Broadway, nor the difficulty with which vehicles are extricated and travel resumed. To drive from Union Square to Wall street requires no little skill on the part of the driver at all times, and the journey is a series of sinuous and tortuous twistings interspersed with some clever legerdemain by which a vehicle is forced through a passage narrower than its own track. Difficult as travel now is upon Broadway, conceive of what it would be were a surface tramway to be operated thereon. The presence of the rails themselves would be a most vexatious hindrance to travel, and the clever twisting and dodging which Broadway drivers are now enabled to practice through long experience would be rendered difficult if not impossible. The appearance of tram-cars would increase this difficulty to a wonderful extent and render Broadway well-nigh impassable. The solid and heavy car would be confined to its rails and in event of a blockade would be denied all lateral movement. No advantage could be taken of clear spots as is now the case with ordinary vehicles, and each succeeding car approaching in either direction would add to the confusion and involve the thoroughfare in an inextricable jam for many streets from the point of blockade. We are not aware of the speed contemplated by the Broadway surface road, but we should think a passenger very lucky if he could accomplish the journey from Fourteenth street to the Battery in a whole morning or afternoon. Just what interest the advocates of "rapid transit" can take in the proposed road we fail to see, for there is certainly no connection of ideas suggested, and the surface road would probably take preëminence as the slowest tramway in existence."

I do not find fault with most of the statements contained in the above lines, but rather with the deductions drawn therefrom. I maintain that this impossibility of lateral motion which the writer claims would be possessed by tram-cars is in fact a positive benefit to the speedy resumption of travel in case of a blockade, and at all times a powerful agent in guiding this travel and averting blockades. Even the rails themselves, instead of being a hindrance would be a further source of travel-guidance. The cars, being confined to the track, must of course proceed in a straight line, but this rectitude of direction would have a great effect in compelling other vehicles likewise to adhere to a straight course, and the practise now common of drivers endeavoring to "cut ahead" of other vehicles would to a great extent be rendered impossible. Naturally and insensibly the bulk of travel would follow the line of rails, and thus the up and down streams would keep in separate channels as far as possible. I also think it fair to presume that other vehicles than the cars themselves would occupy the tracks, and the relief thus obtained would be great. Blockades are created in one of two ways; either by lateral or back pressure—by too great a number of vehicles moving in the same direction, or by two separate streams of vehicle-travel moving in opposite directions—and Broadway is frequently blockaded from both of these causes. In either event the blockade is generally brought about and maintained by the endeavor of drivers to gain an advantage by passing other vehicles bound in the same direction, thus opposing their own vehicles across the direct lines of travel in both directions. It seems to me that the advent of surface roads upon crowded thoroughfares would, instead of proving a further obstacle of travel, tend to diminish the number of blockades, by marking out the channels of travel and maintaining them. And in event of a blockade the presence of the street-cars would also do much to clear it. The line of blocked cars once put in motion would straighten the line of travel and compel the drivers of free vehicles—those not confined to rails—to adhere to the beaten track.

It must be remembered that I am not speaking of Broadway in particular, but of crowded thoroughfares in general, when I claim that the presence of a surface road is an aid to uninterrupted traffic. In the case of Broadway there are other considerations to be discussed, and it is quite possible that the presence of a surface road thereon may not be desirable; but I think that the interruption of travel is not a valid reason for the opposition that has been manifested. Whether the JOURNAL is convinced or not of the soundness of the above argument I cannot tell, but the discussion is an interesting one, and it should be pushed by the street-railway men. Doubtless a good argument could be made on the other side, and it is very likely that few at first thought, would grant the truth of the proposition that surface roads are traffic-guides, but that such is the case seems to have received frequent demonstration. Those streets in populous cities occupied by surface roads seem, as a rule, to be less subjected to blockades than those where vehicle-travel is allowed free sway.

Final Arrangements for the Convention.

THE Third Annual Convention of the American Street-Railway Association will meet in Parlor D. R. of the Fifth Avenue Hotel, New York City, on Wednesday morning, October 15th, at 10 o'clock. The Executive Committee will meet one hour previous to consider such matters as may be brought before them.

The Association will hold its sessions on Wednesday, Thursday and Friday mornings, and the afternoons will be devoted to brief trips and excursions to points of interest and to sight-seeing generally. The Committee of Entertainment have not fully arranged their programme, but it is thought that a trip to Coney Island will be one feature of the afternoon trips. On the evening of Friday, October 17th, the annual banquet of the Association will be held at Delmonico's.

Secretary Richardson declares the outlook very promising for a large and influential gathering of prominent street-railway men and expects as a result of the Convention a notable increase of membership in the Association.

An extended summary of the proceedings of the Convention will be given in the November JOURNAL.

A New Cable System.

AMONG the recent plans for tramways submitted to the New York Board of Aldermen was a novel system of cable traction controlled by patents by the United States Cable Road and Subway Company. The peculiar feature of this new system is that the wheels of the cars are to be run underground, so that only the body of the car will appear above the street. The difference between this system and the ordinary cable systems in operation in this country is that there will be no tracks to break the surface

of the streets. The tracks are laid in tunnels under the pavement, and the wheels running under them are connected with the car above by a steel plate, half-an-inch thick, which moves along through a slot in the roadway. Mr. Nelson B. Adams, one of the inventors, says: "If this system were introduced on Broadway the street would not be altered in appearance in the least, except that a close inspection would reveal two parallel slots half-an-inch wide, running through it. Under the present system in this city the tracks spoil the streets and do immense injury to all kinds of traffic and ruin them for pleasure driving. Under our system tracks can be placed on Fifth avenue without injuring it as a drive. The bottom of the cars will move along close to the ground—only four inches above the surface—and there will be no climbing in or out, and no one can be run over or seriously injured. We propose—at any time or place, when or where it seems desirable—to build archways between the tracks underground and run trains by electric or other wires or cables there."

The Broadway Surface Railroad.

THE second temporary injunction granted in behalf of the tax-payers against the New York Board of Aldermen, restraining them from permitting the construction of the contemplated Broadway Surface Railroad has been dissolved. It is now thought that the company will apply for a new franchise, since a new petition has been submitted to the Aldermen. The construction of the road under the old franchise is considered very doubtful in any event.

Tramways in Rio Janeiro.

THE Brazilian capital is particularly rich in tramways, there being no less than 133¾ miles within the city and suburbs. The four largest of these tramways are the Botanic Gardens, 22½ miles; the St. Christo, 27½ miles; the Villa Isabel, 17 miles; and the Urbain, 28½ miles. Altogether the 133¾ miles of tramway existing in Rio Janeiro and the neighborhood are owned by nine companies. The rolling-stock placed by these companies upon the lines, comprises 554 carriages, of which 363 are used for the conveyance of passengers, and 191 for the carriage of goods. The traction service is carried on by mules and horses, and there are no less than 4,921 of these animals at work upon the lines. The working staff comprises 1,482 persons. The number of passengers conveyed over the lines has averaged 35,532,926 per annum. The net profits realized upon the four principal lines last year were as follows: Botanic Gardens, £63,024; St. Christo, £62,-165; Villa Isabel, £17,516; and Urbain, £43,666. Two of the smaller tramways were worked at a slight loss last year.

The Elevated Railway between Minneapolis and St. Paul.

SURVEYORS have started on the work of fixing the line for the elevated railway between Minneapolis and St. Paul. The line will run from Division street in Minneapolis past Lake Como, and its terminus in St. Paul will be Arundel street. The company embraces some of the heaviest capitalists in the two cities, and by its articles of incorporation the capital stock is to be $3,000,000. It is proposed to run trains between the two cities every fifteen minutes, and the fare each way will be five cents. It is thought that the distance can be made in twenty minutes. The roadbed is to be sixteen feet above the ground, to give ample room for teams below. The bed of the double track will be closely planked, and a four-foot screen will be placed outside the track so that teams may not be frightened at the sight of the engine. The most approved pattern of coaches will be used, and automatic wire gates will be used at the stations which will be located every four blocks within the city limits, and on the intermediate territory as thickly as may be found desirable.

TRAMWAY NOTES.

THE work of constructing the cable line in Philadelphia upon Ninth street by the Philadelphia Traction Company has been impeded by an injunction, obtained by the Ridge Avenue Passenger Railway Company. It is probable that the matter will be amicably adjusted. The company is about to build two additional lines of road, one of which will begin at Twentieth and Wharton streets, go North to Chestnut street, thence to Front, to Walnut, out Walnut to Nineteenth, and thence down to Wharton street. The other line will start at Forty-second and Spruce streets, run to Woodland avenue, thence to Market street, down Market to Front, returning on the same route.

THE Lexington avenue and Fourteenth street Railroad Company, of this city, with a capital of $1,000,000, has been incorporated. It is proposed to run the road through Lexington avenue from Ninety-seventh street to Twenty-third street, which it is to traverse to Fourth avenue, thence to Fourteenth street, where it is to terminate. It is to be double-tracked. As soon as Lexington avenue is opened to the Harlem River the road will be continued Northward. The trustees are John Downey, George W. Lynch, Charles Curtis, Lewis May, George W. Conner, Isaac Hendrix, and Thomas Rogers. It is to be a horse road.

SOME citizens of Kansas City, Mo., have obtained an injunction against the further construction of the cable road in that place. They claim that the streets through which the road is now being built are so narrow as to make it impossible to leave the distance between the rails and the sidewalk that the ordinance requires. The road is about half completed, and it is not believed that the action of the property-holders will prevent its final construction.

A COMPANY has been incorporated in New York State, for the purpose of building and operating a street surface railway from Bartow Station, on the New York, New Haven and Hartford Railroad, to City Island. The line will be a little more than three miles long, and will run nearly the entire length of City Island.

THE St. Louis (Mo.) Cable and Western Railroad has been incorporated. Besides building a cable road in the city, the company propose to buy the St. Louis, Creve Cœur Lake and St. Charles Railway.

THE Moline Central Street-Railway Company, of Moline, Ill., has been incorporated, with a capital stock of $12,000.

New Inventions.

Roberts's Divided Axle Car-truck.

THOMAS H. ROBERTS, of Wilmington, Del., has patented an invention relating to improvements in the construction of car-trucks. It is chiefly conspicuous for a divided axle, and is especially designed to provide for the easy running of railway and tram-cars around sharp curves. The difficulty with the ordinary car-truck lies in the fact that the inner and outer wheels are upon the same axle, and thus in turning a curve the outer wheel is guided by a larger radius, which causes a grinding and slipping of the wheels and a consequent wear of rails and tires, attended by a retardation of speed and a loss of power. The present device is intended to overcome these difficulties which is accomplished by dividing the axles and turning the inner portions of the divided axles to form journals exactly corresponding with the outer journals.

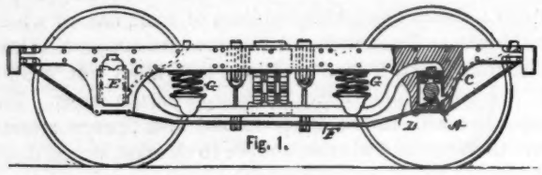
Fig. 1.

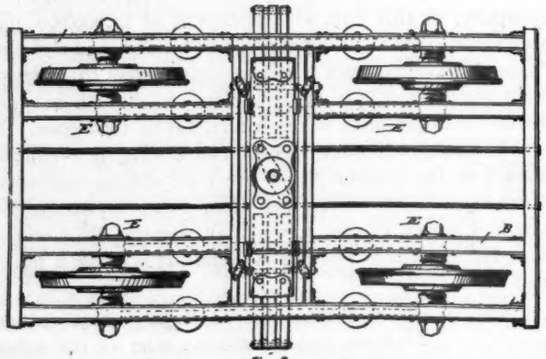
Fig. 2.

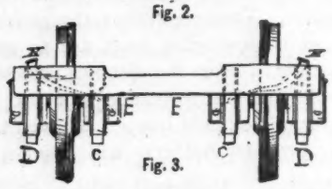
Fig. 3.

ROBERTS'S DIVIDED AXLE CAR-TRUCK.

The accompanying cuts illustrate the device and its operations. Figure 1 is a side elevation of a car-truck embodying the improvements of the invention. Fig. 2 is a plan view, and Fig. 3 an end elevation.

The longitudinal bars B are arranged, as shown, to carry the pedestals C, which correspond with those now in use on the sides D. Extra boxes E, equalizing-bars F, and coiled springs G are used. The entire arrangement of the truck is such that the same pattern of axle-boxes, brasses, equalizing-bars, pedestals, and coiled springs now in use can be used thereon. The inner boxes E, are fed with oil through a small tube leading from an oil receptacle or receiver H, which conveys the oil direct to these boxes from the outside, avoiding the necessity of getting under the truck.

By the construction above described each wheel works separately and independently of the others, and in traveling around curves allows the outer wheels to travel faster, as the greater radius of the outside of the curve demands, thus saving the grinding and slipping of the inner wheels, and the consequent wear of the rails and tires, and avoiding a retardation of speed, together with a loss of power.

Morris's Stirrup-strap.

ROBERT MORRIS, of La Crosse, Wis., is the inventor of a device relating to that part of a car-coupler known as the "stirrup," and to the means for and the manner of securing it to the draw-bar. The accompanying cuts illustrate the device which the inventor denominates a "stirrup-strap."

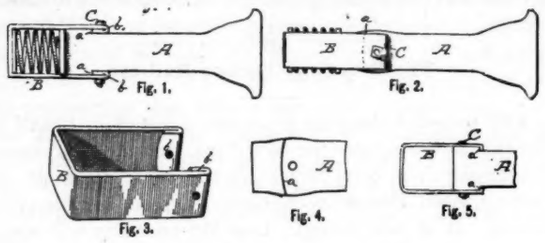
Fig. 1. Fig. 2. Fig. 3. Fig. 4. Fig. 5.

MORRIS'S STIRRUP-STRAP.

Figure 1 is a side elevation of a draw-bar, showing the improved stirrup as applied; Fig. 2 is a plan view of the same; Fig. 3 is a perspective view of the stirrup-strap; Fig. 4 is a detail view showing the end of the draw-bar to which the stirrup-strap is attached, and Fig. 5 shows the construction of the common draw-bar and stirrup now in use. The reference-lettering is similar throughout the figures.

A represents a draw-bar and head of the usual construction, having the vertical dimensions of the end made greater, so as to form shoulders *a a* on the upper and under surfaces, against which the ends of the stirrup-strap B bear when in position, so as to form a greater resistance to the strain to which the stirrup is subjected when in use.

In the old form of freight-car draw-bars in current use, and as shown in Fig. 5, the shoulders *a a* are at right angles with the upper and lower surfaces, and extend laterally in a straight line from side to side; and the strap B has its ends bent at right angles to the longitudinal arms of the stirrup to lap over the shoulders *a a*, and a bolt C, properly secured by a nut, passes through the strap and through the increased vertical dimensions of the contiguous end of the draw-bar, as shown. When it is considered what a great strain the stirrup is subjected to, it will be obvious that most of the strain must be borne by that portion of the bolt C passing through the strap. The bolt will therefore, when in constant use or subjected to a great strain, be cut or broken off, thus throwing all the strain on the ends of the stirrup, which, not being able to stand it, are pulled off the draw-bar. In order to avoid these objections the ends of the strap B are doubled or bent back upon its length to form hooks *b b*, the ends of which bear against the shoulders *a a*. The strap is then secured in position by passing a bolt C, laterally through the two thicknesses of the strap made by the hook, and

through the contiguous vertical portion of the bar A, thus giving that portion of the bolt passing through the strap a greater resisting surface than can be had by the common stirrup and draw-bar, and relieving considerable of the strain from the same by having the ends of the strap bear against the shoulders *a a*.

If desired, the shoulders *a a* may be inversely beveled, as shown in the drawings, and the ends of the straps beveled the reverse of that of the shoulders. This construction would help resist the tendency of the straps to slip off the shoulders. As there is usually a slight oscillation of the draw-bars, especially when the cars to which they are attached are turning curves, the shoulders *a a* are given a slight inverse curve transversely from side to side of the bar, and the extremities of the hooks are curved obversely to the shoulders. This construction permits such oscillation without injury to the bolt C. In the draw-bars of the Miller coupler, where there is considerable oscillation, this stirrup-strap may be employed to great advantage. In order to give additional strength to that part of the draw-bar through which the bolt passes, the vertical sides thereof adjacent to the bolt, are bulged or curved outward, thus increasing the lateral dimensions at that point.

While the shoulders *a a* are preferably inversely beveled and curved transversely, and have a corresponding conformation of the extremities of the hooked part of the stirrup-strap, yet such construction is not absolutely necessary, for the improved stirrup having the hooked ends can be used with the common form of draw-bar to great advantage by placing the bolt C through the hooked ends, instead of through the length of the stirrup.

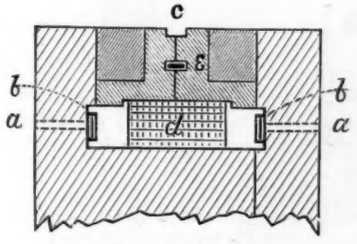

FIG. 1.

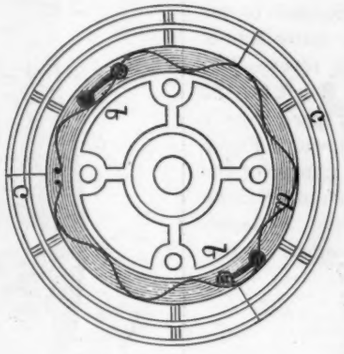

FIG. 2.

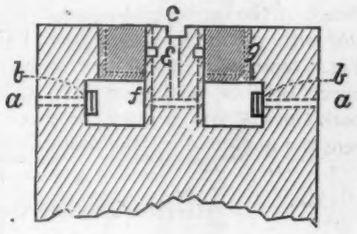

FIG. 3.

SUCKOW'S PISTON-PACKING.

Suckow's Piston-packing.

EDMUND SUCKOW, of Buffalo, N. Y., is the inventor of a new method of piston-packing, the object of which is to provide a means for keeping a tight, close, sensitive and self-adjusting joint between the piston and the cylinder by the action of the steam, and to act also as a lubricant as the piston moves in the cylinder.

The accompanying cuts illustrate the device and its operation. Fig. 1 shows a part section of the piston, cutting through the rings, spring-valves, etc. Fig. 2 is a face view of the piston, the follower being left off so as to expose the center face of rings at C, one-half of the rings being left off; it shows also the inlet spring-valves and wave-line spring or springs. Fig. 3 shows a part section of a so-called solid piston, or where a bull-ring with follower is used, but as altered to this invention. The reference lettering is similar throughout the illustrations.

The body of the piston is of the usual form; *a* represents the small holes or openings leading to the flat spring-valves *b*, which have some softer metal added to a part of the seat, if desired, and are secured in a recess or groove, covering the holes inside the face of the piston and follower underneath the rings. The inside of the rings correspond to the inside edge of the recess so as to form no shoulder by wear, and the arrangement is such that the steam or fluid has a free inlet into the piston, but has no outlet, so that when the steam enters the piston it is retained there, and passing through the openings between the center part of the rings (Fig. 2) or face-side of the bull-ring (Fig. 3) into the circular space *c*, it will act as a central lubricant and prevent any undue pressure within the piston against the inside of the cylinder as well as against the face of the piston and follower. At *d* is shown the position of the wave-line spring or springs. In Fig. 3 the dotted lines at *f* and *c* show the communication between the steam-chambers on each side of the bull-ring and lubricating space *c*. At E is a recess where a light wave-line spring may be inserted to insure always a close joint in starting an engine when the rings are worn. The dotted lines at *g* (Fig. 3) show a so-called shoe or angle-plate on the side of the ring facing the piston and follower where the single rings are cut in one or more places. It is claimed by the inventor that in the use of his device the cutting of the bore in the cylinder by the uneven setting-out of springs with spring-bolts, etc., and the loss of power by too great friction as well as the loss of steam or fluid through slackness of the rings, etc., all of which defects are common in methods hitherto employed, can readily be obviated.

De Witt's Car-check.

JAMES M. DE WITT, of Grand Junction, Colo., has lately invented and patented a railway car-check, designed to prevent the accidental movement of standing cars on railway tracks. It consists of a check-block for railway

tracks, the grooved and recessed block combined with the staple-like rod passing through and embracing the sides thereof, and having the hook ends to engage with the ties or track structure. The check-block consists of an iron shoe made so as to fit over and rest on the rail having a strong iron rod through it, which runs along both sides, and having the ends bent so as to form dogs to catch against the ties when there is any pressure against it. These dogs will prevent the shoe from slipping when the wheel of the car strikes it.

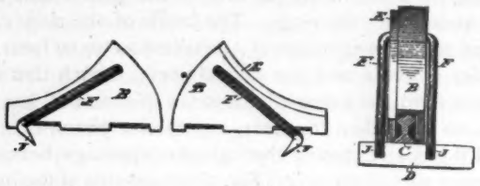

FIG. 1. FIG. 2. FIG. 3.

DE WITT'S CAR-CHECK.

The construction and operation of the device are very simple and can be fully understood by reference to the accompanying cuts. Fig. 1 represents the outer side of the check or shoe B. Fig. 2 represents the reverse side of the check or shoe B, showing the space E left for the flange of the car-wheel to pass over, which space is on a line with the inner side of the rail C, as shown in Fig. 3. Fig. 3 represents an end view, showing the manner of the check or shoe setting on the rail; also the rods F F on both sides of and through the check or shoe. J J represent the hook ends of the rod, catching upon the ties.

Meredith's Safety Coupler.

FENTON A. MEREDITH, of Hagerstown, Md., has recently devised and patented a safety car-coupler, the ob-

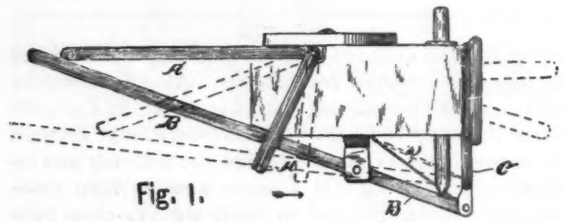

Fig. 1.

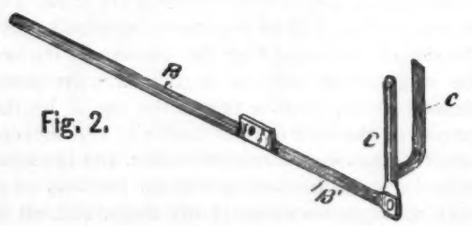

Fig. 2.

MEREDITH'S SAFETY COUPLER.

jects of which are to raise the link in coupling to prevent its being broken, and to accomplish this result without danger to the person performing the operation. The accompanying cuts illustrate the device and the manner of operating it. Fig. 1 is a side elevation of the coupler attached to the draw-head, and Fig. 2 a detail view of the lever and fork for raising the link.

To operate the device, the lever-handle A is thrown forward in the direction of the arrow, and the lever-arm A′ downward, forcing the lever-arm B down and the lever-arm B′ up, bearing the fork C, the prongs of which catch the link and raise it to a horizontal position, as shown by dotted lines in Fig. 1. When the coupling is completed, the lever B is forced down by the spring D, carrying the fork C down and allowing the link free play.

The device can be applied to any ordinary draw-head at a trifling expense.

Hoover's Improved Car-wheel.

WILLIAM HOOVER, of Salt River, Mich., has devised and patented a car-wheel which is herewith illustrated and described. In the accompanying diagrams, Fig. 1 represents a central vertical section of the wheel, and Fig. 2 a detail view of one of the sectional blocks employed in the construction of the wheel.

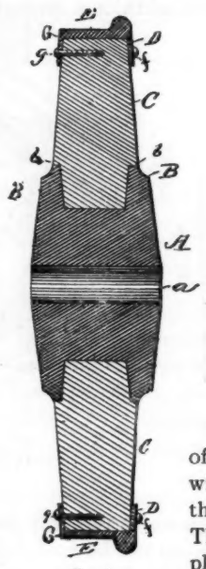

Fig. 1.

HOOVER'S IMPROVED CAR-WHEEL.

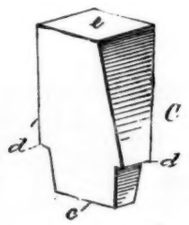

Fig. 2.

HOOVER'S IMPROVED CAR-WHEEL.

In Fig. 1, A represents the hub of the wheel, which is provided with a central perforation *a*, for the passage of the axle-spindle. This hub A, is also provided peripherally with two flanges, B, which are so arranged relatively to each other as to form between them an annular depression which contracts gradually from the top toward the bottom. Each flange B is flattened at the top to present an annular shoulder or seat *b*. A series of blocks or wood sections C (Fig. 2), are decreased toward the bottom, and are cut away at their lower portion to form a tongue *c*, and shoulders or offsets *d*. The upper face *e*, of each block is curved, as shown in Fig. 2. The blocks C are arranged in the wheel, as shown clearly in Fig. 1, so that the tongues *c* rest in the contracted depression between the flanges B, while the offsets *d* of the blocks rest on the annular seats *b*, afforded by the top of the flanges B. The width and proportion of the numerous blocks are such that they fit snugly in position and constitute a practical body for the wheel. A ring or band D, rests against the inner faces of the blocks C, near the periphery of the same, and retains them in position on the inner side of the wheel by means of bolts or other fastening devices, which pierce the ring D and engage the blocks at intervals. The tread E of the wheel has the usual flange at the inner side of its periphery, and is further provided with a depending flange G, which bears against the outer sides of

the blocks C, and retains them in position at the front by means of bolts *g*, which engage blocks alternating with those in which bolts *f* enter from the inner side of the wheel as shown in Fig. 1.

From the foregoing it will be seen that a wheel thus constructed is cheap as well as durable, and that the several parts composing the same may be readily put together in forming the wheel. The contracted depression permits the tongues *c* to be snugly placed between the flanges B, while the provision of the annular seats *b* resists radial strain from the tread toward the hub. By arranging the tread E and band D as described, the tread is secured at the outer side of the wheel, the inward pressure on the flange by the rail being sufficient to hold the tread in position. By removing the bolts *g* of the tread, the blocks C not engaged by the bolts *f* may be readily withdrawn, or tightened by the insertion of additional blocks.

Harlow's Valve-gear for Direct-acting Steam-pumps.

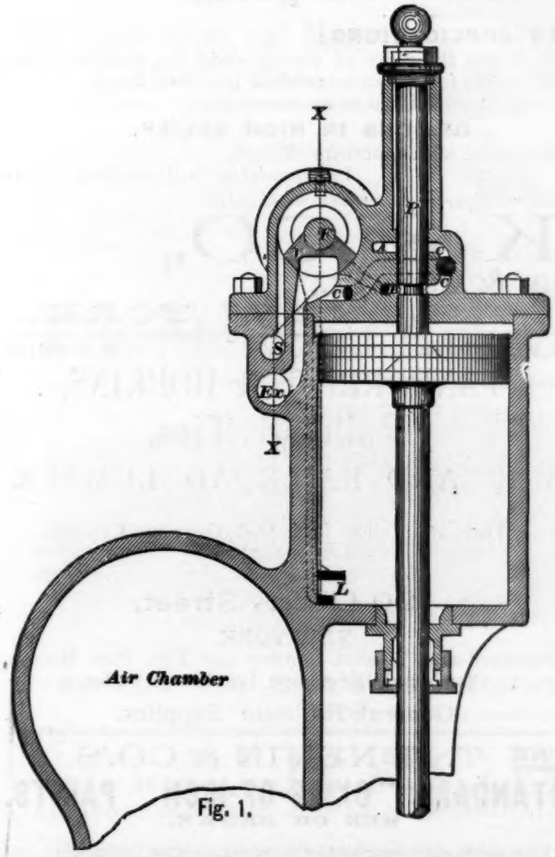

Fig. 1.

HARLOW'S VALVE-GEAR FOR DIRECT-ACTING STEAM-PUMPS.

MELLEN S. HARLOW, of Hoboken, N. J., has invented a valve-gear for direct-acting steam-pumps which is herewith illustrated and described. Fig. 1 represents the complete mechanism, and Fig. 2 represents a section through it. The same letters of reference designate corresponding parts in either figure. S is the main supply to the steam-chest. Ex. the exhaust. L the port to the lower end of the cylinder, and U that to the top. The valve-gear consists of three parts, viz.: the auxiliary valve P, attached to the main piston-rod and moving with it, the auxiliary piston F, and the main valve V, moved by the auxiliary piston. Its operation is readily understood: As represented, the main piston has reached the end of its upward stroke, and the auxiliary-valve P, has opened the ports B and C, exhausting the steam from the end of the auxiliary-piston. Steam enters the other end through the port D, and moves the main valve to the other side. When the main valve is open for the downward stroke the auxiliary ports B and D are covered by the auxiliary-piston, the main valve remaining in its position. When the main piston reaches the lower end of the cylinder the end of the auxiliary-valve P, has passed below the ports A and C, and the auxiliary-piston is moved with the main valve to the other end of its stroke, as previously described, by steam entering through D′.

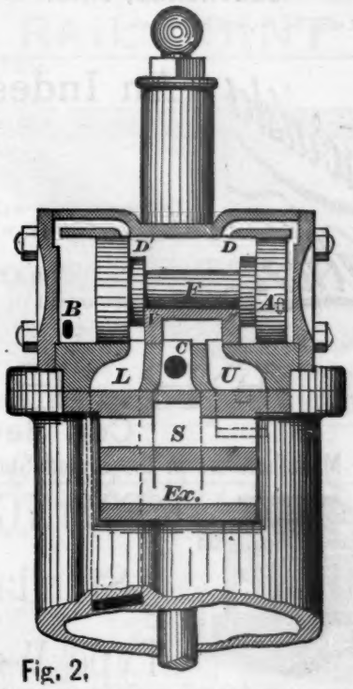

Fig. 2.

HARLOW'S VALVE-GEAR FOR DIRECT-ACTING STEAM-PUMPS.

It will be seen that the movement of the main valve is accomplished without the use of either tappets, links, levers or cams of any kind, and the motion is substantially positive. The auxiliary-piston is steam-cushioned to avoid striking the heads, and this also accomplishes another purpose, *i. e.*, if the auxiliary-piston is moved too far, so as to partially cover the main steam ports, the cushion-pressure returns it so as to leave the ports fully open. The main steam ports, when they enter the cylinder, are divided so that when the main piston nears the end of its stroke the supply of steam is diminished. Similarly the full supply of steam is not admitted until after the piston has traveled a short distance on its return stroke. This provides for a slow motion at the beginning and end of the stroke (approximating the motion from a crank and fly-wheel), avoids striking the heads with the piston, and gives the valves time to seat quietly and without shock. This, with the valve motion as described above, makes a steam-pump practically noiseless at any speed. This valve-gear is especially applicable to locomotive and tank pumps, and also to the air-brake pumps in use on our railways.

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Counsellor in Patent Causes and Solicitor of Patents.
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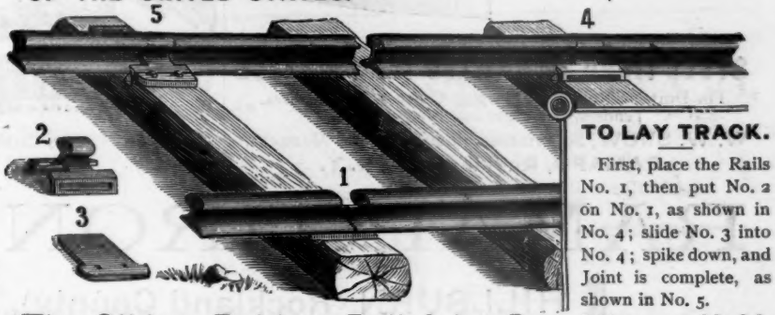

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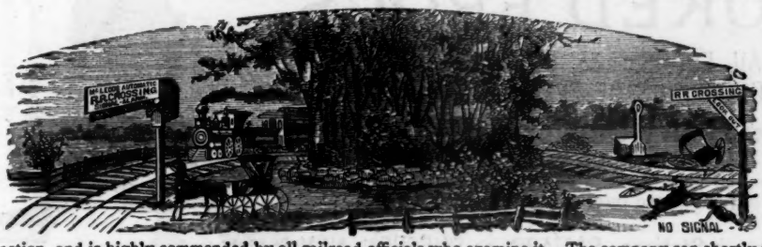

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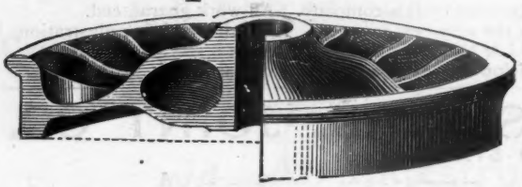

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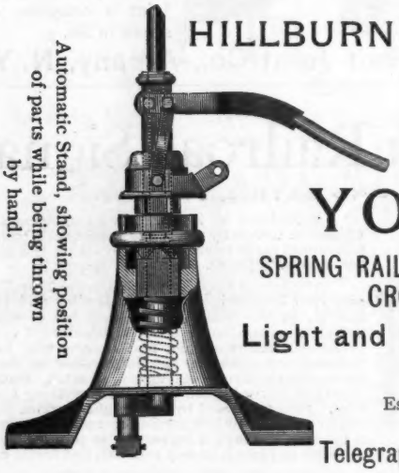
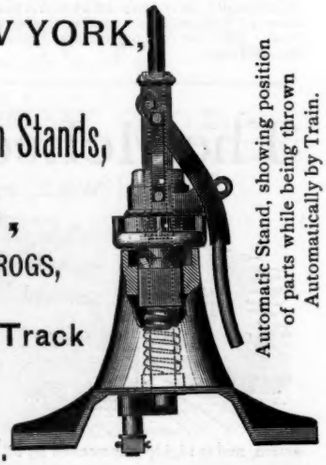

Automatic Stand, showing position of parts while being thrown by hand.


Automatic Stand, showing position of parts while being thrown Automatically by Train.

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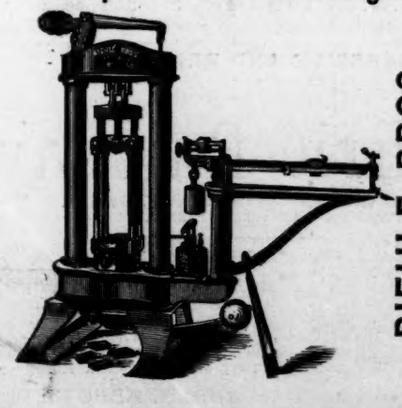

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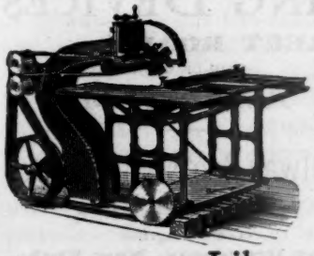

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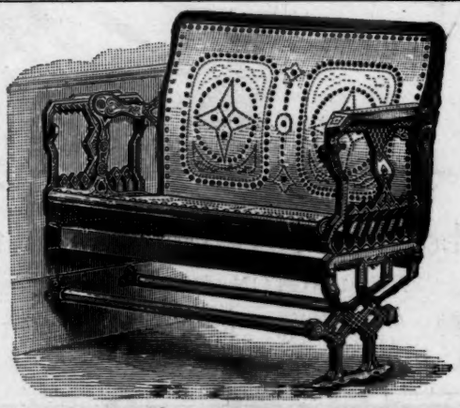

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